

SPECIFICATION MANUAL FOR THE CONSTRUCTION OF

Mount Olivet Assembly of God – Youth Center

Apple Valley, Minnesota 55124

PROJECT NUMBER: 50714

DATE OF DOCUMENTS: February 13, 2007

Prepared by:



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PROJECT DIRECTORY

PROJECT: Mount Olivet Assembly of God
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Apple Valley, MN 55124
Attn: Jim Olson
Telephone: 952-432-4332
Fax: 952-432-2029

GENERAL CONTRACTOR: Eden Builders, Inc.
2277 W. Highway 36, Suite 204E
Roseville, MN 55113
Attn: Dave Lent, Ken Anderson
Telephone: 651-636-0705
Fax: 651-631-8253

ARCHITECT: NEGEN Architects, Inc.
22517 178th Ave., Suite 200
Cold Spring, MN 56320
Attn: Lon Negen
Telephone: 320-685-3304
Fax: 320-685-4039

STRUCTURAL/MECHANICAL/
ELECTRICAL ENGINEER: Duffy Engineering and Associates, Inc.
1424 2nd St. North
Sauk Rapids, MN 56379
Attn: Ryan Seavert, Perry Nistler, Scott Jones
Telephone: 320-259-6575
Fax: 320-259-6991

CIVIL ENGINEER: Surveying and Engineering Professionals
60 10th Ave. South
Waite Park, MN 56387
Attn: Tom Herkenhoff
Telephone: 320-259-8888
Fax: 320-259-9010

CERTIFICATION

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.

Lon D. Negen, AIA-Architect

Registration Number 41402

Date: February 13, 2007

05400 Coldformed Metal Framing
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No Work

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DIVISION 14 - CONVEYING SYSTEMS

No Work

DIVISION 15 - MECHANICAL

See Drawings

DIVISION 16 - ELECTRICAL
See Drawings



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OFFICE: 320-253-4338 • FAX: 320-253-4547

DECEMBER 21, 2006

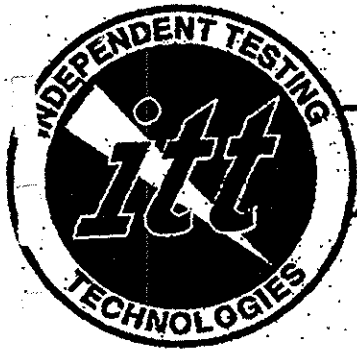
PROJECT 06-566
REPORT OF GEOTECHNICAL EXPLORATIONS

For

MOUNT OLIVET ASSEMBLY OF GOD CHURCH
APPLE VALLEY, MINNESOTA

Prepared For:

NEGEN ARCHITECTS



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December 21, 2006

Mr. Lon Negen
Negen Architects
22517 178th Avenue
Cold Spring, MN 56320

RE: 06-566

Report of Geotechnical Exploration
Mount Olivet Assembly of God Church
Apple Valley, Minnesota

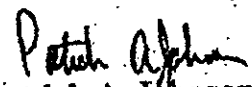
Dear Mr. Negen:

Independent Testing Technologies, Inc. is pleased to submit the results of our subsurface investigation program for this project in Apple Valley, Minnesota. This report represents our work for this project as authorized by you. It includes our recommendations regarding earthwork, fill and compaction, foundation design, wall backfill and pavement design. Three copies are enclosed.

The site has a considerable amount of fill on it that will require soil correction. The majority of the soils consisted of silty sand fill overlying native, poorly graded sands (SP) and silty sands (SM) with gravel. Groundwater was not observed during our investigation. Soil samples obtained during our investigation will be stored at our office for thirty days after the date of this report.

Mr. Negen, it has been our pleasure to work with you on this project. Please contact us if you have any questions or need additional services.

Sincerely,


Patrick A. Johnson, P.E.
MN Registration #22037

CERTIFICATION

**I hereby certify that this report was prepared
by me or under my direct supervision and that I am a
duly Registered Engineer under the laws
of the State of Minnesota.**



Patrick A. Johnson

Date: 12/21/06 **Registration No.:** 22037
December 21, 2006 **22037**

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**GEOTECHNICAL EXPLORATIONS
MOUNT OLIVET ASSEMBLY OF GOD CHURCH
APPLE VALLEY, MINNESOTA
PROJECT 06-566**

A. Introduction

This report is being prepared for use by our client on this specific project. We intend to present this report and our findings in the same logical manner that led us to arrive at our recommendations. This report is based on some general assumptions regarding the anticipated construction based on experience with similar projects. These assumptions and the entire report should be reviewed immediately upon receipt.

Purpose:

The purpose of our investigation was to evaluate the existing soil and water conditions on this site for suitability to construct a new building. The project will consist of the construction of a 16,000 square foot, one-story slab-on-grade pre-engineered building on standard cast-in-place concrete footings. In accordance with your written authorization, we have conducted a subsurface exploration program for the proposed project.

Scope of Services:

Our authorized scope of services included the following:

1. To investigate the subsurface soil and water conditions encountered at eight (8) split-spoon soil boring locations. The borings were planned to be 10 to 20 feet deep at each location.

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Mount Olivet Assembly of God Church

Apple Valley, Minnesota

2. To provide a report of our findings including the results of our subsurface investigation and recommendations regarding earthwork, fill and compaction, foundation design, wall backfill, subgrade preparation and pavement design.

General Site Conditions:

The proposed project site is located to the south of the existing church at 14201 Cedar Avenue South in Apple Valley, Minnesota. The site is currently occupied by a single family home with a detached garage. The site slopes steeply between the house and the church parking lot.

Available Subsurface Information:

According to the Geologic Map of Minnesota, Quaternary Geology, prepared by Howard C. Hobbs and Joseph E. Goebel (1982, Minnesota Geological Survey), this site lies within an outwash unit not associated with a particular moraine. It is associated with the Des Moines glaciation of Pleistocene, Late Wisconsinan age. The drift is derived from parent material in North Dakota and Manitoba.

B. Exploration Program

Eight (8) split-spoon soil borings were conducted on this project. The borings were advanced to 10 to 20 feet deep using a 3 1/4 inch I.D. hollow stem auger. Samples were obtained every 2 1/2 feet for the first 10 feet and every 5 feet thereafter using a 2-inch O.D. split spoon sampler in accordance with the American Society for Testing and Materials (ASTM D1586). Standard penetration values (N-values) were obtained at each sample interval by driving the sampler into the soil using a 140-pound hammer falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler 12 inches is known as the standard penetration resistance or N-value. Where the sampler can not be driven at least 6 inches by 50 blows of the hammer, the total number of blows as well as the distance driven is reported on the boring logs.

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Groundwater levels were noted during drilling and immediately after completion. The holes were backfilled with the auger cuttings. Some settlement of the bore holes may be expected. All of the borings were conducted with a truck mounted drill rig. The boring locations were as close as possible to the proposed building corners. The boring locations can be assumed to be reasonably close and are intended only to provide a reasonable representation of the soil conditions on the site, but should not be considered to be accurate for surveying purposes.

Exploration Results:

All of the borings were conducted in existing driveways, parking lots and yard areas. Borings B-1 and B-2 were conducted in yard areas and encountered topsoil material consisting of silty sand to depths of 9 to 10 inches. The rest of the borings were conducted in driveway and parking lot areas and encountered 2 inches of bituminous pavement.

Below the topsoil material, boring B-1 encountered silty-clayey sand (SC-SM) fill to a depth of 8.0 feet, followed by native silty sand (SM) to termination. Below the topsoil material, boring B-2 encountered native silty sand (SM) to a depth of 6.0 feet, followed by native poorly graded sand (SP) to termination.

Below the pavement, boring B-3 encountered silty sand (SM) fill to a depth of 2.0 feet, followed by native silty sand (SM) to 10.0 feet and then clean, poorly graded sand (SP) to termination. Below the pavement, boring B-4 encountered native silty sand (SM) to 14.0 feet followed by clean, poorly graded sand (SP) to termination. Below the pavement, boring B-5 encountered silty sand (SM) fill to a depth of 2.0 feet, followed by native silty sand (SM) to 4.0 feet and then clean, poorly graded sand (SP) to termination.

Below the pavement, boring B-6 encountered silty sand (SM) fill to a depth of 2.5 feet, followed by native silty sand (SM) to termination. Below the pavement, boring B-7 encountered silty sand (SM) fill to a depth of 7.0 feet, followed by native poorly graded sand with silt (SP-SM) to 13.0 feet and then clean, poorly graded sand (SP) to refusal at

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15.5 feet. Below the pavement, boring B-8 encountered silty sand (SM) fill to a depth of 7.0 feet, followed by native silty sand (SM) to 9.0 feet and then clean, poorly graded sand (SP) to termination.

Penetration Test Results:

The standard penetration blow counts in the native sand soils ranged from 3 to more than 50, which are low to high, indicating that they are in a loose to very dense condition. The standard penetration blow counts in the sandy fill soils ranged from 6 to 12, which are moderate, indicating that they are in a medium dense condition. Refusal of the spoon and auger occurred in borings B-7 and B-8 at the bottom of the borings. Refusal of the auger occurred at a depth of 15.5 feet in boring B-7. In our opinion, refusal was likely due to larger rocks in the till soils and not bedrock. Drilling was relatively easy in the sands near the surface, but became more difficult with depth.

Water Level Observations:

Observations of the subsurface water conditions were made during drilling operations. Groundwater was not observed in any of the borings to the depths explored during drilling. The soils were relatively dry for the most part. The water levels were observed over a very short period of time. However, we feel the water levels observed are an accurate representation of the true water levels on this site at the time of our exploration because of the high permeability of the native soils on this site.

It should be noted that fluctuations in the level of the groundwater can occur due to variations in rainfall, temperature, spring thaw and other factors not evident at the time of our investigation. Mottled soils were not observed. Mottled soils are a historical indication of a temporarily or seasonally saturated soil condition in natural soils. Grey soils were also not observed. Grey soils are an indication of a permanently saturated soil condition.

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C. Engineering Review

Discussion:

Based on our findings, the native soils, with the exception of the fill, appear to be fairly well suited for the proposed building and site improvements. The fill soils should not be considered suitable for support of the anticipated structure. The existing fill should be completely removed from all building and oversizing areas and replaced with compacted structural fill. The native, inorganic soils observed in the borings are considered suitable for building support.

Maximum foundation loads could be expected to be in the range of 4-6 kips per linear foot for wall footings and 60-80 kips for column loads. The native soils underlying the fill on this site are suitable for support of the proposed building.

D. Recommendations

The following recommendations are based on our understanding of the proposed project. If our understanding of the project is not accurate, or if changes are made to the project scope, please inform us so that our recommendations can be amended, if necessary. We have included recommendations regarding earthwork and construction that may help in cost estimates and aid in design. We should be allowed to review the proposed construction plans to provide further detailed recommendations, if necessary. Without the opportunity to review the final construction plans, the recommendations made in this report may no longer be valid.

Site Grading:

We recommend that the existing topsoil and fill material be removed from the construction area prior to beginning grading. We estimate that this will require an excavation of up to 7 feet over this site. The existing topsoil is not suitable for use as structural fill. The topsoil should be wasted or stockpiled for use as landscaping material. Some of the existing fill is

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suitable for re-use as structural fill and some is not. The fill in boring B-7 is not suitable for use as structural fill.

We recommend the bottom of the excavation be observed by a soils engineer or a qualified technician to verify that native, competent material has been reached. We recommend the topsoil stripping and excavation to remove the existing fill be oversized one foot for every foot of fill required to reach planned grade (1:1 oversizing). Soils can change dramatically over short horizontal distances, therefore these depths should be used as a guide.

After removal of any unsuitable soils, we recommend clean, mineral fill, meeting the requirements of structural fill, be placed and compacted to bring the building areas to grade.

Structural Fill:

The on-site soils consisting of poorly graded sands (SP) and poorly graded sand with silt (SP-SM) are considered excellent material for use as structural fill. These soils are relatively easy to compact using vibratory compaction equipment. We recommend that any imported fill consist of mineral soils meeting the following requirements. No organic soils, roots, stumps, logs, brush, etc. should be used as structural fill below any foundation or pavement section. We recommend that all fill material be free of soft, wet or frozen soils, highly expansive soils, rubble, debris and rocks in excess of 6 inches in diameter. The fill should be as uniform as possible both in composition and moisture content.

We recommend all fill placed in the building and pavement areas be compacted in 12-inch loose lifts to a minimum of 98% of standard proctor (ASTM D698) maximum density. All fill should be compacted at a moisture content within plus or minus 2% of

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the optimum moisture as determined by a standard proctor. We recommend compaction tests be taken on any fill in the building and pavement areas at a rate of one test per 2 vertical feet per 2,500 square foot area, with a minimum of two tests per fill area.

Foundations:

The N-values recorded in the penetration borings indicate that the existing native sandy soils on this site are in a dense condition capable of supporting the proposed structure. Clean structural fill placed and compacted as recommended above will also be suitable for support of the proposed structure. All exterior footings should be placed at a minimum depth of 42 inches below proposed final grade to provide protection from frost damage. Interior footings in heated areas can be placed at any convenient depth as long as they are on native soils or properly compacted fill. In unheated areas and drive-through window areas where the parking lot abuts the building, we recommend the footings be placed 60 inches deep due to increased frost penetration depths below the pavement.

Any footings placed on native soils or on properly compacted fill should be proportioned for a maximum net allowable soil bearing pressure of 3000 psf. We recommend compaction tests be taken on any fill below the footings at a rate of one test per 50 linear feet for wall footings and one test per column footing. We recommend compaction tests be taken immediately prior to pouring the footings.

The recommended bearing pressure is a net value and represents the actual loads that may be transmitted to the soil independent of overburden pressures. We estimate total settlement to be less than 1/2 inch with differential settlement about half of this if the recommendations in this report are followed.

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We recommend a minimum of 6 inches of clean, free draining washed sand with less than 5% passing a No. 200 sieve be placed beneath the floor slabs. This will provide a capillary break and a uniform level subgrade for the floor slabs. We recommend floor slabs be designed using a modulus of subgrade reaction of 300 pounds per cubic inch.

E. Pavement Recommendations

The subgrade sand soils encountered are classified as A-2-4 soils in accordance with the American Association of State Highway Transportation Officials (AASHTO) classification system. A-2-4 soils are rated fair material for use as parking lot subgrade material. In no instance should organic soils be used as parking lot subgrade material. Without benefit of a laboratory R-value determination and based on Mn/DOT guidelines, an R-value of 30 can be assumed for these materials.

Based on an assumed R-value of 30, we recommend the following bituminous pavement section for general car and light truck parking lots:

<u>Thickness</u>	<u>Course/Description</u>	<u>G.E.</u>
1.5"	Mn/DOT 2360 LV-3 Wear Course	3.4"
2.0"	Mn/DOT 2360 LV-3 Non-Wear Course	4.5"
7.0"	Mn/DOT 3138 Class 5 or 6 Aggregate Base	7.0"
10.5"	TOTAL	14.9"

In using the assumed R-value for bituminous pavement design, it is essential that the subgrade be constructed of uniform soils at a moisture content and density in accordance with Mn/DOT specification 2105 and capable of passing a test roll in accordance with Mn/DOT specification 2111. The native, undisturbed soils may need preparation (drying and compacting) to pass a proof roll. If the subgrade is not compacted, uniform and

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capable of passing a test roll, then we recommend the subgrade be scarified and recompacted or subcut and replaced with geotextile fabric and select granular material meeting Mn/DOT specification 3149. The top of the subgrade should be compacted to a minimum of 100% of standard proctor maximum density. The subgrade should be sloped towards the edges to provide drainage.

F. Closing

Our work was performed for geotechnical purposes only and not to document the presence or extent of any contamination on the site. We can note that our crew did not detect any obvious contamination by sight or smell during drilling operations. However, human senses are limited in terms of contamination detection and, therefore, the lack of detection through human sensing does not preclude the possibility of the presence of contamination of the site.

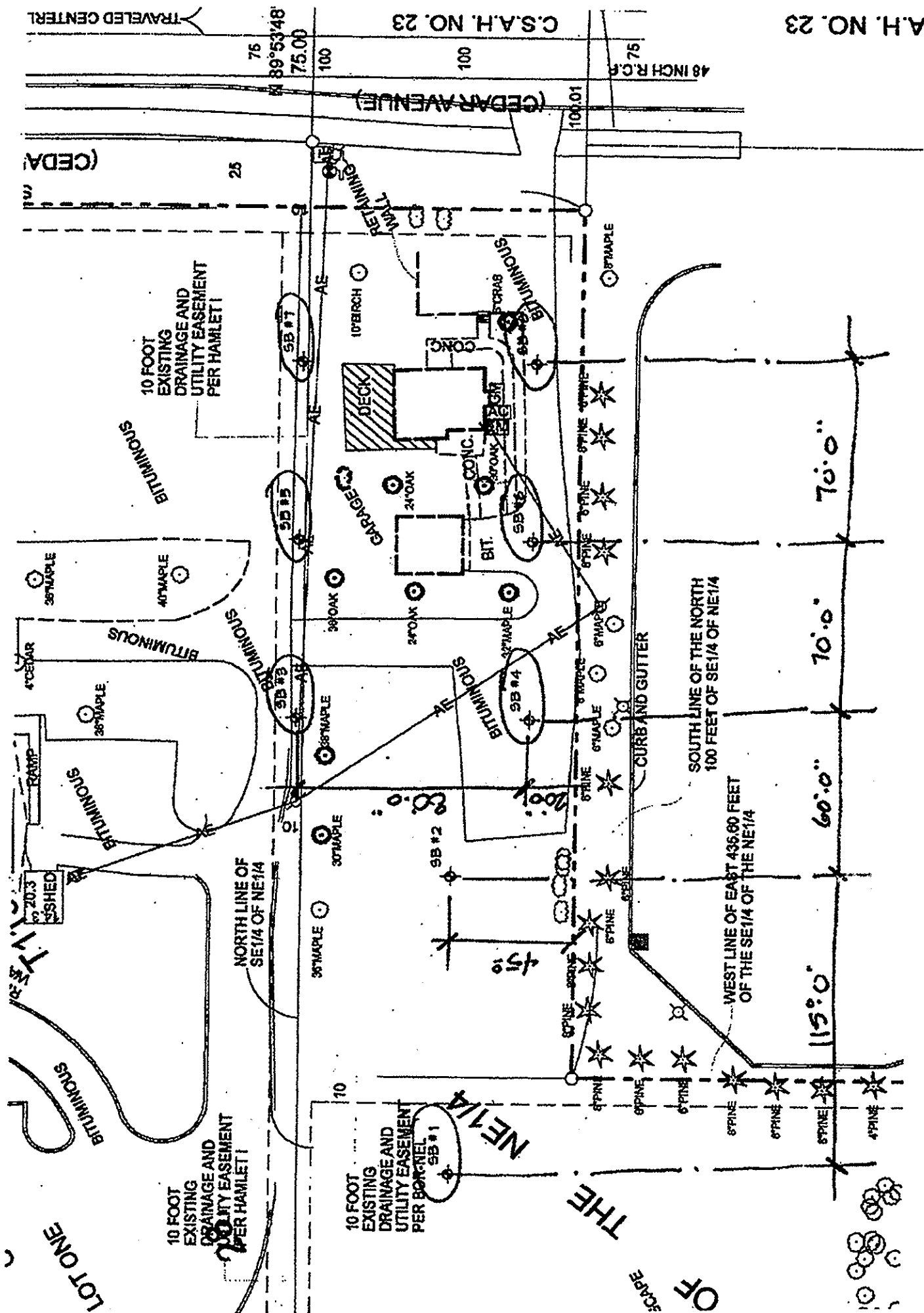
This report represents the result of our subsurface investigation and is based on information gathered at specific locations. Subsurface conditions can change a great deal over short horizontal distances. Also, the actual interface between strata will likely be a gradual transition rather than an abrupt change as represented on the boring logs.

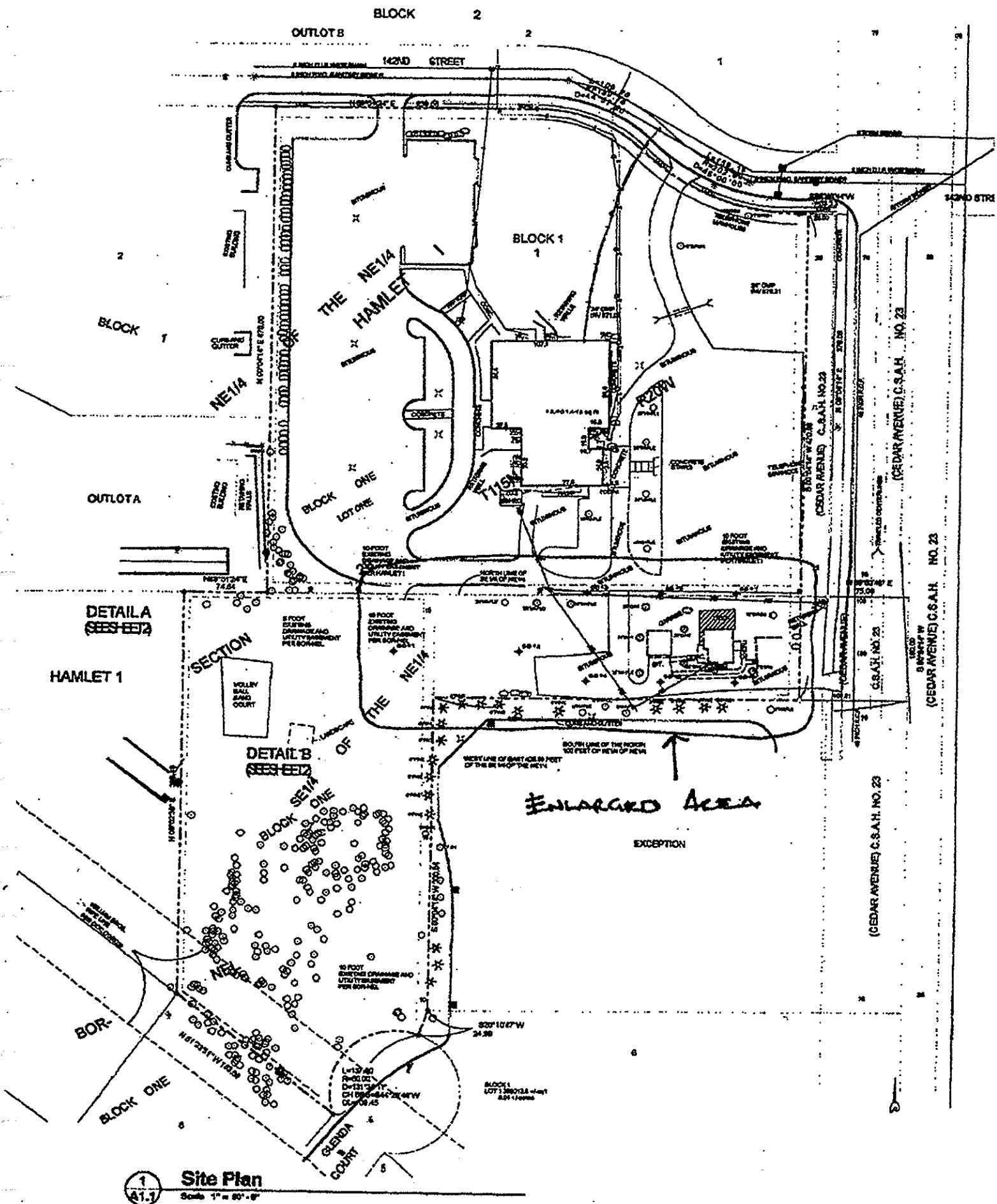
Geotechnical engineering is based extensively on opinion. Therefore, the data contained in this report should be used as a guide, and we recommend that construction monitoring be performed by a qualified geotechnical engineer or technician. Any changes in the subsurface conditions from those found during this geotechnical investigation should be brought to the attention of a soils engineer.

c:b6566-rpt

APPENDIX 1

BORING LOCATION PLAN





APPENDIX 2

SOIL BORING LOGS

INDEPENDENT TESTING TECHNOLOGIES, INC.

LOG OF SOIL BORING

PROJECT: 06-566 NEGEN ARCHITECTS
MT OLIVET CHURCH - ASSEMBLY OF GOD
APPLE VALLEY, MINNESOTA

DATE: 12-18-06 BORING #: B-1
START TIME: 10:35 END TIME: 10:54

METHOD: 3 1/4" I.D. Hollow Stem Auger
CREW: RB / BH
ELEVATION: 112.26

LOCATION: See Boring Location Plan (West Parking Area)

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Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
10"	SM	SILTY SAND, black - Topsoil.				
5.0	SC-SM	SILTY CLAYEY SAND, fine grained, w/ a trace of GRAVEL, brown, mottled - Fill.		7		
8.0				7		
10.0	SM	SILTY SAND, fine grained, w/a trace of GRAVEL, brown.		8		
11.5				4		
		Boring complete to 11 1/2 feet. Water was not encountered during drilling.				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: 06-566 NEGEN ARCHITECTS
MT OLIVET CHURCH - ASSEMBLY OF GOD
APPLE VALLEY, MINNESOTA

DATE: 12-18-06 **BORING #:** B-2
START TIME: 10:59 **END TIME:** 11:16

LOCATION: See Boring Location Plan (East Parking Area)

METHOD: 3 1/4" I.D. Hollow Stem Auger

CREW: RB / BH

ELEVATION: 109.84

Page 1 of 1

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
9"	SM	SILTY SAND, black - Topsoil.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.		6		
6.0				11		
10.0	SP	POORLY GRADED SAND, fine to medium grained, w/ a trace of GRAVEL, brown.		12		
11.5				7		
		Boring complete to 11 1/2 feet. Water was not encountered during drilling.				

INDEPENDENT TESTING TECHNOLOGIES, INC.**LOG OF SOIL BORING**

PROJECT: 06-566 NEGEN ARCHITECTS
 MT OLIVET CHURCH - ASSEMBLY OF GOD
 APPLE VALLEY, MINNESOTA

DATE: 12-18-06 **BORING #:** B-3
START TIME: 1:21 **END TIME:** 1:51

LOCATION: See Boring Location Plan (Moved 15' North)

METHOD: 3 1/4" I.D. Hollow Stem Auger
CREW: RB / BH
ELEVATION: 108.96

Page 1 of 1

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
2.0		2 inches Bituminous.				
2.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown to dark brown - Fill.				
5.0	SM	SILTY SAND, fine grained, w / a trace of GRAVEL, brown.		4		
				9		
				13		
10.0	SP	POORLY GRADED SAND, fine to medium grained, w/ a trace of GRAVEL, brown.		5		
15.0				10		
20.0				11		
21.5		Boring complete to 21.5 feet. Water was not encountered during drilling.				

INDEPENDENT TESTING TECHNOLOGIES, INC.**LOG OF SOIL BORING**

PROJECT: 06-566 NEGEN ARCHITECTS
 MT OLIVET CHURCH - ASSEMBLY OF GOD
 APPLE VALLEY, MINNESOTA

DATE: 12-18-06 **BORING #:** B-4
START TIME: 11:19 **END TIME:** 11:46

LOCATION: See Boring Location Plan (Southwest Building Area)

METHOD: 3 1/4" I.D. Hollow Stem Auger

CREW: RB / BH

ELEVATION: 105.40

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Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
2.0		2 inches Bituminous.				
	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.				
5.0				3		
				4		
10.0				5		
		Was moist at 10 feet.		4		
14.0						
15.0	SP	POORLY GRADED SAND, fine to medium grained, w/ a trace of GRAVEL, brown.		4		
20.0						
21.5				8*		*Sample not recovered.
		Boring complete to 21.5 feet. Water was not encountered during drilling.				

INDEPENDENT TESTING TECHNOLOGIES, INC.**LOG OF SOIL BORING**

PROJECT: 06-566 NEGEN ARCHITECTS
 MT OLIVET CHURCH - ASSEMBLY OF GOD
 APPLE VALLEY, MINNESOTA

DATE: 12-18-06 **BORING #:** B-5
START TIME: 1:54 **END TIME:** 2:24

LOCATION: See Boring Location Plan (Moved 15' North)

METHOD: 3 1/4" I.D. Hollow Stem Auger
CREW: RB / BH
ELEVATION: 102.42 **Page 1 of 1**

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
2.0		2 inches Bituminous.				
2.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown - Fill.				
4.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.		8		
5.0	SP	POORLY GRADED SAND, fine to medium grained, w/ a trace of GRAVEL, brown.		12		
				12		
				12		
10.0				4		
15.0				10		
20.0				25*		*On rock.
21.5		Boring complete to 21.5 feet. Water was not encountered during drilling.				

INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: 06-566 NEGEN ARCHITECTS
 MT OLIVET CHURCH - ASSEMBLY OF GOD
 APPLE VALLEY, MINNESOTA

DATE: 12-18-06 **BORING #:** B-6
START TIME: 12:44 **END TIME:** 1:12

LOCATION: See Boring Location Plan (Moved 15' Southeast)

METHOD: 3 1/4" I.D. Hollow Stem Auger
CREW: RB / BH
ELEVATION: 105.84

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Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
2"		2 inches Bituminous.				
2.5	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, dark brown - Fill.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.		13		
				10		
				8		
10.0				9		
15.0				10		
20.0						
21.5				16*		*Sampled not recovered- on rock.
		Boring complete to 21.5 feet. Water was not encountered during drilling.				

INDEPENDENT TESTING TECHNOLOGIES, INC.

LOG OF SOIL BORING

PROJECT: 06-566 NEGEN ARCHITECTS
MT OLIVET CHURCH - ASSEMBLY OF GOD
APPLE VALLEY, MINNESOTA

DATE: 12-18-06 BORING #: B-7
START TIME: 2:30 END TIME: 2:55

METHOD: 3 1/4" I.D. Hollow Stem Auger
CREW: RB / BH
ELEVATION: 99.28

LOCATION: See Boring Location Plan (Moved 15' North)

Page 1 of 1

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
2"		2 inches Bituminous.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown to dark brown to black - Fill.	6			
7.0			7			
10.0	SP-SM	POORLY GRADED SAND w/ SILT, fine to medium grained, w/ a trace of GRAVEL, brown.	10			
13.0			22			
15.5	SP	POORLY GRADED SAND, fine to medium grained, w/ a trace of GRAVEL, brown.	*			*50 for 0 inches. On rock.
		Boring terminated at 15 feet due to refusal. Rock encountered.				

INDEPENDENT TESTING TECHNOLOGIES, INC.**LOG OF SOIL BORING**

PROJECT: 06-566 NEGEN ARCHITECTS
MT OLIVET CHURCH - ASSEMBLY OF GOD
APPLE VALLEY, MINNESOTA

DATE: 12-18-06 **BORING #:** B-8
START TIME: 12:12 **END TIME:** 12:40

LOCATION: See Boring Location Plan (Southeast Building Area)

METHOD: 3 1/4" I.D. Hollow Stem Auger

CREW: RB / BH

ELEVATION: 104.55

Page 1 of 1

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
2.0		2 inches Bituminous.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown to dark brown - Fill.		7		
7.0				12		
	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.		7		
10.0	SP	POORLY GRADED SAND, fine to medium grained, w/ a trace of GRAVEL, brown.		8		
15.0				9		
20.0				*		
21.5						*50 for 3 inches. Sample not recovered - on rock.
		Boring complete to 21.5 feet. Water was not encountered during drilling.				



22517 178th Ave
Suite 200
Cold Spring, Minnesota 56320
320 685.3304
320 685.4039
www.negenarchitects.com

ADDENDA #1

Date: February 27, 2007

PROJECT:

Mount Olivet Assembly of God-Youth Center
14201 Cedar Avenue

Make the following revisions to drawings and specifications previously issued.

GENERAL:

~~The bid date has been~~

SPECIFICATIONS:

Bid Categories

1. 5400 Cold Formed Metal Framing shall be part of Bid Package #11, not Bid Package #4 as specified.
2. 10520 Fire Protection Specialties. Provide 6 fire extinguishers & cabinets to be located by Fire Marshall.
3. 02832 Segmental Retaining Wall System shall be Bid Package #22, bidders shall provide product literature along with bid, formal approval is not required.

DRAWINGS:

1. Sheets MP0.1, MPO.2, M1.1, M5.1, P1.1, P4.1, P5.1, P6.1, P9.1, F0.1, F0.2, F1.1 are being reissued due to the inadvertent release of documents dated 9.22.06, mechanical documents should be dated 2.09.07
2. Sheet A6.1-insert revised Roof Plan. roof insulation to be 4" polyisocyanurate over sloped roof structure, tapered expanded polystyrene to be used to cricket roof to slope to drain.

Approvals:

02832

07531

Segmental Retaining Wall System
EPDM Membrane Roofing

Versa-Lok
Hunter Panels

Lon D. Negen, AIA-Architect

Registration Number 41402

Date: February 28, 2007

Group #6 (108A, 110A)

- Hinges
- Lockset (storeroom)
- Top & bottom flush bolts-inactive leaf
- Kick plate

Group #7 (109A)

- Hinges
- Threshold
- Weather-stripping
- Astragal
- Lockset (entrance)
- Top & bottom flush bolts-inactive leaf

Group #8 (109C)

- Hinges
- Cylinder
- Closer
- Exit device
- Vertical rod

Group #9 (113A)

- Hinges
- Closer
- Threshold
- Weather-stripping
- Lockset (entrance)
- Deadbolt

Group #10 (115A)

- Hinges
- Lockset (privacy)

Group #11 (120A, 120B)

- Spring Hinges
- Lockset (entrance)

3. 9680 Carpet, provide carpet border in all rooms receiving carpet, 4" high, Shaw Contract, Any Event Collection, style 60498, color; attaboy 98113.

DRAWINGS:

1. See attachment #1 for enlarged exterior elevation & further EIFS clarifications.
2. See attachment #2 for pillar elevation rot further material callouts, steel handrail & screen to be provided on both sides of exterior stairs.
3. Sheet A4.2 & 4.3,
 - a. Below grade vapor retarder to be 6 mil.
 - b. Contractor has the option of providing top of footing elevations shall be 96'-8" minimum.
4. Sheet A5.2,
 - a. Items identified as solid surface countertop shall be P. lam. #3.
 - b. P. lam. countertops shall be supported by P. lam. supports.
 - c. 10/A5.2, curved P. lam. wall @ coffe bar shall be provided under bid package #5.
 - d. 13/A5.2 shall be eliminated.
5. Sheet A5,
 - a. Masonry fireplace indicated on 2 /A5.5 & 3/A5 shall be provided by allowance of \$15,000.00 labor & material
6. Sheet A8.1,
 - a. Window type W1 to have casement type operation in lower right hand section (2'-0"x3'-6").
 - b. Aluminum supplier to provide aluminum cover between window type W2, W3,W4 & aluminum corner cover between frame type IV & window type W2.



22517 178th Ave.
Suite 200
Cold Spring, Minnesota 56320
320.685.3304
320.685.4039
www.negenarchitects.com

ADDENDA #2

Date: March 6, 2007

PROJECT:

Mount Olivet Assembly of God-Youth Center
14201 Cedar Avenue

Make the following revisions to drawings and specifications previously issued.

SPECIFICATIONS:

1. 8520 Aluminum Windows,
 2. 8710 Door Hardware, provide door hardware as scheduled;
- Group #1 (100A, 100C, 101A, 101B, 109B)

Hinges
Closer
Cylinder
Threshold
Weather-stripping
Rim exit device

Group #2 (100B)

Hinges
Cylinder
Closer
Threshold
Weather-stripping
Exit device
Concealed vertical rod

Group #3 (102A, 103A, 104A)

Hinges
Closer
Push / pull
Kick plate

Group #4 (105A, 117A)

Hinges
Closer
Lockset (storeroom)
Kick plate

Group #5 (106A, 106B, 106C, 106D, 107A, 110B, 111A, 111B, 111C, 112A, 112B, 112C, 114A, 116A, 119A, 120A, 120B)

Hinges
Lockset (classroom)
Kick plate

SECTION 02310 - DOMESTIC WATER

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all labor, materials, tools and equipment and performances of all work and services necessary or incidental to water main and service line construction as shown on the Project Drawings and as specified herein.

A. RELATED WORK

- A. Section 02420: TRENCH EXCAVATION, BEDDING AND BACKFILL

B. METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under DOMESTIC WATER shall be included in the lump sum price bid for the project.
- B. The furnishing and installing of specific items and/or the performance of work under certain circumstances shall not be individually paid. The costs shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:
 - 1. Concrete blocking or metal ties, include in price bid for water main.
 - 2. Valve umbrella anchorage assembly and extension rod shall be included in the unit price bid for valves.
 - 3. Hydrostatic, leakage and continuity testing, include in the unit price bid for water main.
 - 4. Locating and connecting to an existing water main or hydrant, include in the unit price bid for water main.
 - 5. Furnishing and installing thrust block, tie rods and joint restraints as shown on the plans and as specified.
 - 6. Adjusting gate valve boxes to top of the bituminous base course when wear course is to be added at a later date.

1.04 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.05 REFERENCES

- B. Reference CEAM Specification No. 2611 shall apply to construction of water main and service line, except as modified herein.

7. Sheet S4,

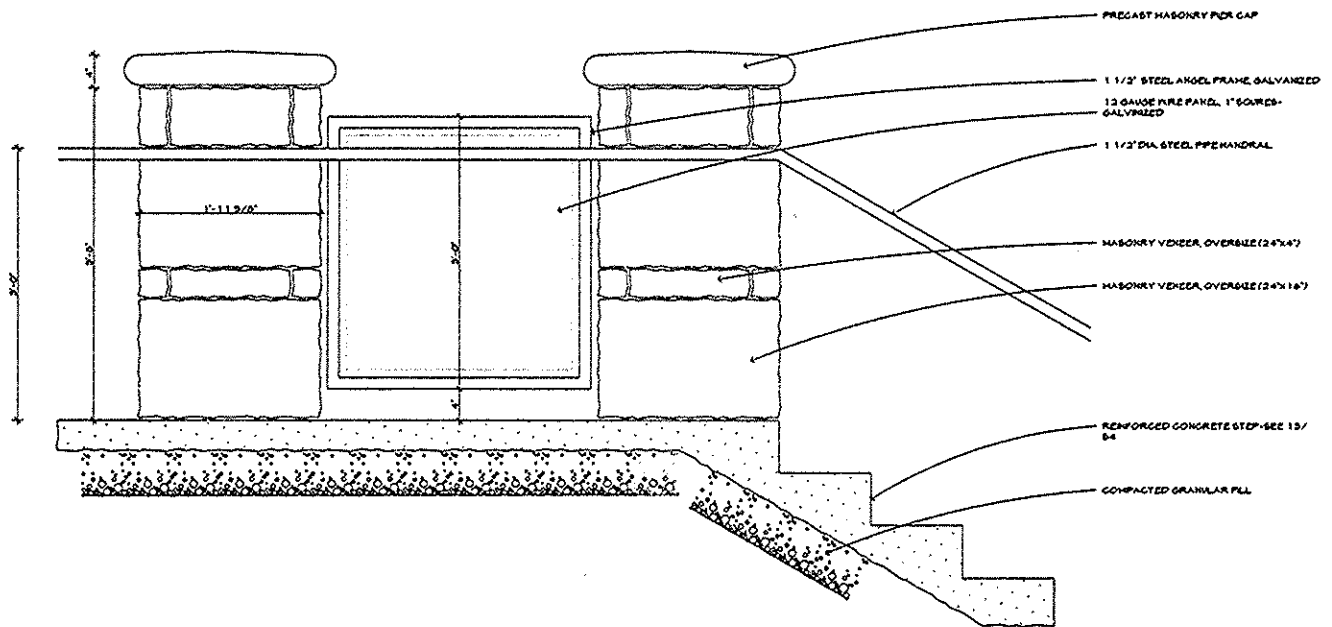
a. Note alternate interior footing construction on details 12/S4 & 12A/S4.

A handwritten signature in black ink, appearing to read "Lon Negen", with a horizontal line extending from the end of the signature.

Lon D. Negen, AIA-Architect

Registration Number 41402

Date: March 6, 2007



2 Pillar Elevation
 Addenda 2 Scale 1" = 1' - 0"

Advertisement for Bids

1.1 INVITATION

- 1.1.1 Bids will be received from Bidders (Subcontractors and Material Suppliers) for the proposed youth center approximately 16,000 square feet constructed of pre-engineered steel/structural metal stud frame. Exterior finished being exterior insulation and finish system, masonry veneer. The new building for Mount Olivet Assembly of God is located at 14201 Cedar Ave. South, Apple Valley, MN. 55124.
All questions regarding interpretation of plans to be directed to either Ken Anderson or Dave Lent of Eden Builders, Inc.

1.2 PROJECT DESCRIPTION

- 1.2.1 All work covered in this specification and shown on the drawings referred to herein shall be included in this project, unless it is specifically stated and that particular part is excluded.
- 1.2.2 Eden Builders, Inc., General Contractors have been appointed as Purchasing Agent for the Mount Olivet Assembly of God project. In accordance to the requirements of the State of Minnesota for tax exempt projects, separate bids are required for materials and for labor for the project.
- 1.2.3 Bids are to be broken out as separate bids for material and labor. Failure to do so may void the acceptance of your bid submission. Bids for materials and labor will be reviewed separately. Acceptance of one bid does not mandate the acceptance of the other from the same bidding subcontractor.

1.3 BASIS OF BID

- 1.3.1 Sub-bids to single prime negotiated construction contract to include General, Mechanical, and Electrical work. .

1.4 BID OPENING

- 1.4.1 Bids shall be received at the General Contractor's office by May 9, 2007 by 1:00 pm.
Eden Builders, Inc.
2277 W. Highway 36, Suite 204E
Roseville, MN 55113
Phone: Office (651) 636-0705
Cell: Dave Lent (612) 369-0773

Cell: Ken Anderson (612) 369-2207

Fax: (651) 631-8253

- 1.4.2 The church building committee will look at the bids after the General Contractor has analyzed them.

1.5 EXAMINATION OF DOCUMENTS

1.5.1

- A. Bid Documents may be examined at Eden Builders, Inc. (651) 636-0705.

- B. The bidders shall visit the site of the work to acquaint themselves with all the local conditions affecting the work, including the structure of the ground, existing utilities and services, the obstacles which may be encountered and all other conditions relative to the work to be performed. And if awarded the contract, shall not be allowed any extra compensation by reason of any unforeseen difficulties or obstacles which the bidder could have discovered or reasonably anticipated prior to the bidding.

1.6 PROCUREMENT OF DOCUMENTS

- 1.6.1 Invited Bidders (Subcontractors and Material Suppliers) may secure sets of the Bid Documents from the Contractor.

Advertisement for Bids

1.1 DOCUMENTS

- 1.1 Bid Documents include the Project Manual, Construction Drawings and Addenda. Addenda are documents issued prior to receipt of bids which modify, clarify or interpret the Bid Documents. Addenda become part of the Contract Documents when the Contract Agreement is executed.

1.2 INTERPRETATIONS DURING BIDDING

- 1.2.1 Notify the Architect/Engineer of any omissions, discrepancies, or ambiguities in the Bid Documents not later than seven (7) calendar days prior to receipt of bids.
- 1.2.2 Interpretation or correction of the Bid Documents will be issued by Addendum. Addenda will be delivered to each person or firm on record as holding a set of Bid Documents either by mail or by fax. Interpretations or corrections given by any other means shall not be binding or relied upon.
- 1.2.3 It is the intent of the drawings and specifications to include all labor, material, equipment and transportation necessary for the proper execution and completion of the entire project.

1.3 SUBSTITUTIONS DURING BIDDING

- 1.3.1. Prior approval of substitutions for specified materials, equipment or systems shall be obtained from the Architect/Engineer. Submit substitution request, with attached product information, so that it may be received not later than seven (7) calendar days prior to receipt of bids. Submit duplicate request form and stamped, self-addressed envelope or a fax number if a reply is desired.
- 1.3.2 A request for substitution constitutes a representation that the person submitting request:
 - A. Has investigated the proposed product and determined it is equivalent to or superior in all respects to product specified.
 - B. Will provide the same warranties for the substituted product as the product specified.
 - C. Warrants that the same maintenance service and source of replacement parts, as applicable, are available similar to the specified product.
 - D. Warrants that the proposed substitution will not delay the work schedule.
 - E. Warrants that the proposed substitution will not affect dimensions or functional clearances.

- F. Will provide payment for required changes, including Architect/Engineer design and detailing, and construction costs caused by the substitution which may later become apparent.
- 1.3.3 Architect/Engineer will review requests for substitution with reasonable promptness and notify all bidders by addendum of decision whether a proposed substitution has been accepted.
- 1.3.4 Substitutions will not be considered when they are indicated or implied on subsequent submittals (e.g. shop drawings) without separate previous request for substitution and Architect/Engineer approval.
- 1.3.5 Substitutions will be made only if they are to the Owner's benefit, as determined by the Architect, or equivalent to specified products.

1.4 RECEIPT OF BIDS

- 1.4.1 The Owner reserves the right to accept or reject alternates in the bid in any order or combination.
- 1.4.2 It is to be understood that Owner is not in any way obligated to accept your bid, the lowest bid, or any other bid. Moreover, the Owner may require time to evaluate bids prior to issuing notification of the successful bidder. It is further understood that Owner shall not be held to have accepted your bid until you receive a contract from Owner and are requested to execute it.

1.5 RETURN OF BID DOCUMENTS

- 1.5.1 It is requested that you return the Bid Documents in reusable condition in the event you are not the successful bidder.

INSTRUCTIONS TO BIDDERS

American Institute of Architects "Instruction to Bidders" (AIA Document A701 1987 Edition) shall become part of this specification, a copy of this document is available at the Architect's office for Contractor's review.

INSTRUCTIONS TO BIDDERS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

American Institute of Architects "General Conditions of the Contract for Construction" (AIA Document A201 1997 Edition) shall become part of this specification, a copy of this document is available at the Architect's office for contractor's review.

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

BID PACKAGES

Division	Section Title	Scope
Bid Package #1		
2220	Clearing & Grubbing	Material / Labor
2250	Temporary Erosion Control	Material / Labor
2305	Trench Excavation and Backfill	Material / Labor
2310	Domestic Water	Material / Labor
2330	Sanitary Sewers	Material / Labor
2350	Storm Sewers	Material / Labor
2505	Excavation and Embankment	Material / Labor
2510	Subgrade Preparation	Material / Labor
2520	Aggregate Base	Material / Labor
2530	Plant-mixed Bituminous Paving	Material / Labor
2730	Concrete Curb and Gutter and Driveway	Material / Labor
2765	Pavement Markings	Material / Labor
2920	Turf Establishment	Material / Labor
Bid Package #2		
02930	Exterior Plants	Material / Labor
Bid Package #3		
02775	Concrete Walks	
03300	Cast-in-place Concrete (see structural sheet specifications)	Material / Labor
03450	Architectural Precast Concrete (see structural sheet specifications)	Material / Labor
04810	Unit Masonry Assemblies (see structural sheet specifications)	Material / Labor
Bid Package #4		
05120	Structural Steel (see structural sheet specifications)	Material / Labor
05210	Steel Joists (see structural sheet specifications)	Material / Labor
05310	Steel Deck (see structural sheet specifications)	Material / Labor
05400	Coldformed Metal Framing	Material / Labor
05500	Metal Fabrications	Material
Bid Package #5		
05500	Metal Fabrications	Labor
06105	Miscellaneous Carpentry	Material / Labor
06402	Interior Architectural Woodwork	Material / Labor
10431	Signs	Labor
10520	Fire Protection Specialties	Labor
Bid Package #6		
07210	Building Insulation	Material / Labor
Bid Package #7		
07241	Exterior Insulation & Finish Systems – Class PB	Material / Labor

Bid Package #8

07531 Epdm Membrane Roofing Material / Labor

Bid Package #8

07920 Joint Sealants Material / Labor

Bid Package #9

08111 Standard Steel Doors and Frames Material/Labor

08211 Flush Wood Doors Material / Labor

08710 Door Hardware Material / Labor

08800 Glazing for 08211 Material / Labor

Bid Package #10

08411 Aluminum framed Entrances And Storefronts Material / Labor

08520 Aluminum Windows Material / Labor

08800 Glazing for 08411 & 08520 Material / Labor

Bid Package #11

09250 Gypsum Board Material / Labor

Bid Package #12

09310 Ceramic Tile Material / Labor

09651 Resilient Floor Tile Material / Labor

09653 Resilient Wall Base and Accessories Material / Labor

09680 Carpet Material / Labor

Bid Package #13

09511 Acoustical Panel Ceilings Material / Labor

Bid Package #14

09912 Interior Painting Material / Labor

09931 Wood Stains And Transparent Finishes Material / Labor

Bid Packages #15

10431 Signs Material / Labor by 06105

Bid Package #16

10520 Fire Protection Specialties Material / Labor by 06105

Bid Package #17

10801 Toilet and Bath Accessories Material / Labor by 06105

DIVISION 11 - EQUIPMENT**DIVISION 12 - FURNISHINGS****Bid Package #18**

13125 Metal Building Systems Material / Labor

DIVISION 14 - CONVEYING SYSTEMS

No Work

Bid Package #19

15400 Plumbing (see mechanical sheet specifications)

Material / Labor

Bid Package #20

15800 HVAC (see mechanical sheet specifications)

Material / Labor

Bid Package #21

16000 Electrical (see electrical sheet specifications)

Material / Labor

BID FORM

DATE: _____

Name of Bidder

Address

Telephone #

**Mount Olivet Assembly of God
14201 Cedar Avenue South
Apple Valley, MN 55124**

Signature

The undersigned having carefully examined the Bidding Requirements, the General Conditions of the Contract, Drawings, and Specifications, as well as the conditions affecting the work, propose to furnish in accordance with such drawings and specifications, all material and labor required for the construction of the Mount Olivet Assembly of God-Youth Center in Apple Valley, Minnesota. Included with the drawings and specifications are addendum _____, _____, and, which receipt is acknowledged.

The project is tax exempt, therefore the material and labor bids need to itemized.

BASE BID

Base Bid for Section _____, described as _____, including the cost of the work and the Contractor's fee, for the lump sum of _____ Dollars (\$_____).

Labor (\$_____))
Material (\$_____))

If the contractor is bidding more than one section, please complete the following, as appropriate.

Base Bid for Section _____, described as _____, including the cost of the work and the Contractor's fee, for the lump sum of _____ Dollars (\$_____).

Labor (\$_____))
Material (\$_____))

Base Bid for Section _____, described as _____, including the cost of the work and the Contractor's fee, for the lump sum of _____ Dollars (\$_____).

Labor (\$_____))
Material (\$_____))

BID FORM

BID FORM

DATE: _____

Name of Bidder

Address

Telephone #

**Mount Olivet Assembly of God
14201 Cedar Avenue South
Apple Valley, MN 55124**

Signature

The undersigned having carefully examined the Bidding Requirements, the General Conditions of the Contract, Drawings, and Specifications, as well as the conditions affecting the work, propose to furnish in accordance with such drawings and specifications, all material and labor required for the construction of the Mount Olivet Assembly of God-Youth Center in Apple Valley, Minnesota. Included with the drawings and specifications are addendum _____, _____, and, which receipt is acknowledged.

The project is tax exempt, therefore the material and labor bids need to itemized.

BASE BID

Base Bid for Section _____, described as _____, including the cost of the work and the Contractor's fee, for the lump sum of _____ Dollars (\$_____).

Labor (\$_____))
Material (\$_____))

If the contractor is bidding more than one section, please complete the following, as appropriate.

Base Bid for Section _____, described as _____, including the cost of the work and the Contractor's fee, for the lump sum of _____ Dollars (\$_____).

Labor (\$_____))
Material (\$_____))

Base Bid for Section _____, described as _____, including the cost of the work and the Contractor's fee, for the lump sum of _____ Dollars (\$_____).

Labor (\$_____))
Material (\$_____))

BID FORM

SUBCONTRACTORS INDEMNITY AND INSURANCE REQUIREMENTS

Exhibit 'A'

(1) **INDEMNIFICATION** To the fullest extent permitted by the law the Subcontractor shall indemnify, save, protect and hold harmless MOUNT OLIVET ASSEMBLY OF GOD, its owners, engineers and employees (collectively referred to hereinafter as "MOUNT OLIVET", and others as required in the Contract documents, and their agents, invitees, employees, and Subcontractors from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, costs and disbursements arising out of or resulting from Subcontractor's performance of its work under the Contract documents. This indemnification and hold harmless obligation shall not be subject to deduction, offset, limitation, or reduction for any reason.

(2) **INSURANCE** The Contractor shall maintain during the progress of the Project during the warranty period, insurance with the minimum limits and coverage as shown in the following or higher, if required in the Contract Documents:

(A) **WORKER'S COMPENSATION INSURANCE** including Occupational Disease Insurance meeting the statutory requirements of the State in which the work is to be performed together with Broad Form All States endorsement and containing Employer's Liability Insurance in an amount of at least \$500,000.00. The Subcontractor will have attached to its policy an Alternate Employer Endorsement naming Mount Olivet Assembly of God therein and will provide a waiver subrogation in favor of Mount Olivet Assembly of God.

(B) **COMPREHENSIVE GENERAL LIABILITY INSURANCE** providing limits for Bodily injury with Personal injury including its employees of \$1,000,000.00 each occurrence, and \$1,000,000.00 aggregate: property Damage \$1,000,000.00 each occurrence, \$1,000,000.00 aggregate. The Insurance Policy must include MOUNT OLIVET ASSEMBLY OF GOD the Owner, Broad Form Property Damage, Contractual Liability, Products and Completed Operations coverage (which shall be maintained in force for a period of two years after substantial completion of the project or for such longer period of time as is described in the Contract Documents) and must be endorsed as PRIMARY/NON-CONTRIBUTORY to any insurance of the ADDITIONAL INSURED. CU Exclusions must be deleted when applicable to operations performed by the Subcontractor. A waiver of subrogation in favor of MOUNT OLIVET ASSEMBLY OF GOD shall also be included. In addition, the Subcontractor shall maintain an umbrella liability policy providing the same coverage and with the same ADDITIONAL INSURED as the basic policy in the amount of \$1,000,000.00.

(C) **COMPREHENSIVE AUTOMOBILE LIABILITY** on an occurrence basis covering all Owned, Non-Owned, and Hired Vehicles for limits of liability equal to those in (B) above.

(D) In lieu of including MOUNT OLIVET ASSEMBLY OF GOD and others if required by the contract documents as ADDITIONAL INSURED in the Subcontractors' liability insurance coverage as required in (B) above, the Subcontractor must provide separate Owners & Contractors Protective Liability Policy in the ADDITIONAL INSURED name as the limits of liability equal to those in (B) above. Such policy must indicate that it is PRIMARY-NON-CONTRIBUTORY to any insurance of the ADDITIONAL INSURED.

(E) A certificate of Insurance on an approved form must be delivered to MOUNT OLIVET ASSEMBLY OF GOD prior to start of work and must state coverage will not be altered, canceled or allowed to expire without thirty (30) days written notice by registered mail to MOUNT OLIVET ASSEMBLY OF GOD.

(F) Contractor shall require and obtain equivalent insurance coverage to that provided for in this Exhibit from each of Subcontractor's sub-subcontractors or suppliers, if any, before permitting them on the site of the project, or cover them as additional insured under Contractor's policies.

(G) It is understood and agreed that the specified insurance coverages and limits required by this Exhibit shall not limit or qualify the contractor's responsibilities and liabilities, or the remedies available, under the Contract Documents or the law.

(H) MOUNT OLIVET ASSEMBLY OF GOD may furnish, erect, or provide equipment, appurtenances and devices, motorized or otherwise, for its use to complete its Contract. If the Subcontractor intends to use such items, the Subcontractor agrees to cover such use within the insurance policies required by Exhibit A against either any claims of injury or damage to persons on the property caused by such use and to name Mount Olivet Assembly of God as an additional insured party with respect to such use. Liability limits shall be the same as in (B) above. Physical Damage insurance against damage to such items themselves shall be on a Replacement Cost basis waiving subrogation rights against MOUNT OLIVET ASSEMBLY OF GOD.

(I) It is understood and agreed that authorization is hereby granted to MOUNT OLIVET ASSEMBLY OF GOD to withhold payments due to the Contractor under this or any other contract or business undertaking between MOUNT OLIVET ASSEMBLY OF GOD and Contractor until a properly executed Certification of Insurance providing insurance as required herein, accompanied by a signed Contract or Purchase Order are received by MOUNT OLIVET ASSEMBLY OF GOD.

(J) Contractor agrees that these Indemnity and Insurance Requirements set forth herein shall become and be part of any future Contract or Purchase Order issued by MOUNT OLIVET ASSEMBLY OF GOD to the Contractor as though fully set forth herein said Contract or Purchase Order.

ACCEPTED: _____
Signature

Printed Name: _____

For: _____
Company Name

Date: _____

Exhibit B

PAY REQUEST FORM (Please make Copies)

Project Name: _____

Payment Request No. _____ Invoice No: _____

Billing Period From: _____ To: _____

STATEMENT OF CONTRACT AMOUNT

- | | |
|-----------------------------|----------|
| 1. Original Contract Amount | \$ _____ |
| 2. Approved Change Orders | \$ _____ |
| 3. Adjusted Contract Amount | \$ _____ |

PROGRESS BILLING

- | | |
|--|----------|
| 4. Work Completed on Contract (____ % to date) | \$ _____ |
| 5. Less Previous Work Completed | \$ _____ |
| 6. AMOUNT DUE THIS REQUEST | \$ _____ |

(Requests are due by the 25th of the Month)

CERTIFICATE OF THE SUBCONTRACTOR

I hereby certify that the work performed and the materials supplied to date, as shown on the above, represent the actual value of accomplishment under the terms of the Contract (and all authorized changes thereto) between Mount Olivet Assembly of God and the undersigned, relating to the above referenced project.

I also certify that the payments, less applicable retention, have been made through the period covered by the previous payments received from the Contractor, to (1) all subcontractors and (2) for all materials and labor used in or in connection with the performance of this contract. I further certify that I have complied with the Federal, State, and Local tax laws, including but not limited to Social Security laws, Unemployment Compensation laws, Workers' Compensation laws, and Wage and Hour and/or Prevailing Wage laws insofar as applicable to the performance of the Contract.

In consideration of the payments received, and upon receipt of the payment of this request, the undersigned hereby waives, releases and forever discharges Mount Olivet Assembly of God surety, and the project owner from all actions, causes of action, claims, expenses, losses, damages, and demands including but not limited to any demands for attorneys' fees, costs and disbursements that the undersigned, his heirs, legal representative, successors, sub-subcontractors, employees, and assignees may now have or that might subsequently accrue to the undersigned arising out of or in any manner Connected with, directly or indirectly, labor performed, materials furnished, or any other work performed on the above referenced project.

Date: _____

Company: _____

By: _____

Print Name: _____

Title: _____

Exhibit C

1. All layout, field dimensions, grades, and verification of existing dimensions for Contractor's own scope of work shall be the responsibility of the Contractor. Contractor will provide or establish gridlines, bench marks and common working points.
2. Contractor is responsible for daily clean up and legal disposal of its own trash off the site. Subcontractor shall leave the worksite 'broom' clean and ready for use by others.
3. Contractor agrees to maintain or restore the integrity of fire rated barriers when penetrations are made through rated systems.
4. Contractor will make provisions for temporary heat and other general conditions as required by the contract documents, but does not represent that these services are necessarily adequate for all specific trade work. Contractor shall provide any special power hook-ups, 'task' lighting, safety equipment, 'cold weather protection', and hoisting necessary to perform contractor's work.
5. Contractor shall comply with all specifications related to its scope of work. Any duplication of work in other specifications or other contracts shall not relieve this Subcontractor of any work.
6. Contractor shall monitor and comply with all applicable building or safety code requirements and shall be responsible for any fines due to lack of compliance with code requirements by Subcontractor, including all related expenses losses or damages of affected parties.
7. Contractor is responsible for receiving, unloading, and providing safe storage its own building materials and equipment, and shall not rely on Contractor-provided storage. Contractor is not responsible for expenses, losses or damage due to theft or vandalism of tools, materials and equipment.
8. All requests for payment must be submitted on Mount Olivet Assembly of God payment application forms. Failure to follow this procedure may delay the payment of monies owed the subcontractor until the following draw. The Contractor will apply for progress payment draws once each month.
9. Contractor must complete all punch list items in a timely fashion to the satisfaction of the Contractor. Subcontractor agrees that all required as-built drawings, manuals, and warranties are to be submitted before any retainage is reduced and/or released.
10. Contractor agrees to comply with Contractor's NO SMOKING policy. Smoking will be allowed in designated areas only.
11. Mount Olivet Assembly of God requires 100% Hard Hats on all job sites.

Contractor Signature

Date

Exhibit D

SUPPLIER/SUB-SUBCONTRACTOR LIST

PROJECT: _____

YOUR COMPANY NAME: _____

Supplier/Sub-Subcontractor

Phone No.

Amount

Contact

[illegible]

****Return this completed form to Project Manager with your executed contract.

I hereby certify that to the best of my knowledge, the above information is true and complete.

Signature

Date _____

We will not be using any subcontractor or suppliers on this project.

Signature _____

Date _____

Exhibit E

Company Name _____

Project _____

We are requiring that our subcontractors report to us their safety records and overall EMR Rate for your latest reporting period. Please complete the following information and Return this completed form to Project Manager with your executed contract.

REPORTING PERIOD _____

TOTAL MAN-HOURS _____

LOST TIME ACCIDENTS _____

RECORDABLE ACCIDENTS _____

EMR RATE _____

(EXPERIENCED MODIFICATION RATE, which can be obtained from your insurance company)

Exhibit F

RE: HAZARD COMMUNICATION

To ensure a safe jobsite, Mount Olivet Assembly of God requires that each contractor submit the following:

1. A list of any hazardous or caustic materials that will be used on the jobsite.
2. The applicable Material Safety Data Sheets (MSDS) for each hazardous or caustic material to be used.

NO PAYMENTS will be issued until this information is received in our office.

*If you will not be using any hazardous materials on the jobsite, please sign below:

We will not be using any hazardous or caustic materials on the jobsite.

Signature

Project

Company

Date

****If you are using hazardous materials on this jobsite, please list below or attach.

Exhibit "G"

Labor Relations:

Contractor shall at all times supply a sufficient number of qualified workers to perform the work covered by this Contract on the Project with promptness and diligence, and shall, upon Construction Manager's request, take any and all steps available to Contractor, under its contracts and the law, to implement and enforce a reserved gate system applicable to the work, to discipline or discharge workers who decline to work with other union or non-union workers and/or to lawfully replace workers who choose to engage in a strike, labor dispute or other work stoppage or cease to work because of picketing or a labor dispute of any kind. Contractor agrees to take any and all steps available to it to perform the work with supervisory and/or replacement workers, in case of any such strike, labor dispute, picketing or other work stoppage, and agrees that Owner may, at its option and without prejudice to any other remedies it may have, after forty-eight (48) hours' written notice to contractor, terminate the contract of contractor for work on this Project in case of any failure to perform the work arising therefore. In such case, Owner shall have the right to enter upon the Project premises and take possession, for the purpose of completing the work hereunder, of all contractor's materials, tools, and equipment thereon. Further, Owner may finish the Project work, either with its own employees or those of other contractors. When terminated by Owner, contractor will not receive any further payments under the contract or otherwise until an accounting is made under this Attachment. Contractor shall remain liable for any expenses or damages which Owner incurs as a consequence of contractor's failure to perform due to a labor dispute and may deduct such damages from any monies then due or thereafter to become due to contractor whether pursuant to the contract or otherwise. If expenses or damages incurred by Owner in completing the work exceed the unpaid balance of any monies due to contractor from Owner, Contractor shall pay the difference to Owner. Owner shall have a lien upon all on-site material, tools, equipment, or other property of Contractor on this Project or other Projects of Contractor to secure the payment of such expenses and damages. In the event of any inconsistency between the provisions of this Attachment and any other provisions of the Contract Agreement or the Contract documents, the provisions of this Attachment shall prevail. No provisions of the Contract Agreement or the Contract documents with respect to arbitration or determination of disputes by the architect, arbitrator or others, shall apply to this Attachment. No labor dispute, picketing, cessation of work, work stoppage or strike shall be deemed to be "beyond the control" of Contractor for the purposes of this Contract unless all of the provisions of this Attachment have been adhered to by Contractor.

Subcontractor Signature

Date

SECTION 02220 - CLEARING AND GRUBBING

PART 1—GENERAL

1.01 SUMMARY

- A. This section covers the furnishing of all labor, materials, tools, equipment and all work and services necessary or incidental to clearing and grubbing trees, stumps and brush as indicated on the drawings or as specified herein.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. Measurement and compensation for the following items shall be paid to the referenced specification or as modified below:
 - 1. No exception to the referenced specification is made.
- B. The furnishing and installation of specific items and/or the performance of work under CLEARING AND GRUBBING shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:
 - 1. Permits and fees for the disposal of materials.
 - 2. Protecting existing improvements from damage.

1.03 SPECIFICATION REFERENCES

- A. MnDOT Specification No. 2101 shall apply to clearing and removing trees, stumps and brush, except as modified herein.
- B. Unless noted otherwise, the provisions in this section are in addition to the referenced specification.

1.04 SUBMITTALS

- A. No exception to the referenced specification is made.

PART 2—PRODUCTS

2.01 NO EXCEPTION TO THE REFERENCED SPECIFICATION IS MADE.

PART 3—EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. All trees, stumps, brush, seed, grass, roots or other undesirable material within the construction limits shall be disposed of by the Contractor in accordance to all local and state laws, ordinances and requirements.

END OF SECTION

SECTION 02250 - TEMPORARY EROSION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to temporary erosion control as indicated in the plans or as specified herein or as directed by the Engineer.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under TEMPORARY EROSION CONTROL shall be included in the lump sum price bid for the project and shall include all measures needed to comply with these plans and the MPCA "General Storm Water Permit".

1.03 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.04 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 2573.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Inlet protection devices shall conform to the following requirements
 1. Infrasaft Sediment Control Barrier Polyethylene construction (or equal).
 2. Filter Fabric wrap shall be permeable in nature and secured around the structure.

PART 3 - EXECUTION

3.01 TEMPORARY EROSION CONTROL

- A. The Contractor shall meet all requirements of the General Storm-water Permit for Construction Activity (MNR100001) for this project. A copy of the permit is included in the Appendix of these specifications.
- B. All exposed soil areas draining to a storm water conveyance system or a surface water, shall have temporary protection or permanent cover for the exposed soil areas at all times. Temporary seeding shall be installed in accordance with the following schedule for all exposed soil areas:

Type of Slope	Temporary Protection or Permanent Cover Where the Area Has Not Been, or Will Not Be, Worked by the Contractor For:
Steeper than 1 Vertical: 3 Horizontal	7 Days
Between 1:3 and 1:10	14 Days
Flatter than 1:10	21 Days

- C. No direct compensation shall be made for temporary erosion control, except as specifically identified in the Schedule of Unit Prices.

3.02 CONSTRUCTION REQUIREMENTS

- A. Every effort shall be made by the Contractor to put the cleanest water possible into the storm drainage systems.
- B. The Contractor shall install erosion control devices where indicated on the plans and/or where directed by the Engineer. The erosion control measures as shown on the plans shall be considered the minimum requirements with additional measures required dependent on construction sequence and schedule.
- C. The Contractor will be required to co-sign for a "General Storm Water Permit" for construction activity with the Minnesota Pollution Control Agency (MPCA). The application form and information is included as an appendix of these specifications. The Owner will initiate the Permit process and pay the required application fee. The Contractor will be required to comply with all of the terms and conditions of the Permit which also includes performing the required inspections of the erosion control devices and maintaining an Inspector's Log for the MPCA Storm Water Permit. A copy of the proposed "Log" form is included in the appendix.
- D. Inlet protection shall be used around all catch basins and other surface water access to any existing or proposed storm water conveyance system.
- E. Temporary erosion control devices shall be constructed, maintained and left in place until such time as permanent erosion control measures are in place or when instructed to remove them by the Engineer. Exit areas and adjacent roads shall be kept clean of excess soil by routine sweeping and as needed after storm events..
- F. Prior to construction, the Owner, Engineer and Contractor shall observe the existing storm water outfall system and discharge area and shall document the existing conditions. Upon completion of the paving and turf establishment, the storm water outfall system and discharge area shall be observed and increased sediment deposits shall be removed and disposed of by the Contractor. All increases in sediment deposits shall be considered to have originated from the project site.
- G. The slopes along the property that carry storm water from the site shall be protected with a silt fence extending along the property line. Periodic maintenance must be performed to insure fence

is protecting sediment from leaving the project site.

- H. The contractor shall imbed the silt fence fabric into the soil as shown on the standard detail.

END OF SECTION

SECTION 02305 - TRENCH EXCAVATION AND BACKFILL

PART 1—GENERAL

1.01 SUMMARY

- A. This section covers the furnishing of all labor, materials, tools, equipment and all work and services necessary or incidental to the trench excavation and backfill necessary to construct underground utilities, as indicated on the drawings or as specified herein.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under TRENCH EXCAVATION AND BACKFILL shall be included in the lump sum price bid for the project, no direct compensation will be made for compliance with the provisions contained herein.
- B. The cost for furnishing and installing of specific items and/or the performance of work under certain circumstances shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:
 - 1. Interference with the other above and underground structures and utilities.
 - (a) The removal and restoration, protection of existing structures and utilities which are shown on the plan and for which there is no bid item for the removing and restoring, or working around the utility.
 - 2. Foundation materials placed in lieu of performing necessary dewatering.
 - 3. Bulkheading of existing pipes to be abandoned in place.
 - 4. Foundation material, granular bedding, and encasement materials, where specified.
 - 5. Crushed rock foundation materials used in lieu of bedding materials in the specified bedding zone, where specified.
 - 6. The removal and disposal of unsuitable native materials for bedding and/or backfill.
 - 7. Providing and maintaining service.
 - 8. The replacement of all material displaced due to shrinkage or loss during the excavation and backfilling operations.
 - 9. Delays due to other utility conflicts which result during the course of construction.
 - 10. Protecting existing improvements and previously accepted elements of this construction from damage.
 - 11. Protecting the inverts of other utility pipes from the accumulation of debris and soil, the removal of blockages which threatens to damage property, and/or the cleaning of both the newly constructed lines and the existing lines of all debris and soil which accumulated during the construction.

1.3 SPECIFICATION REFERENCES

- A. Reference CEAM Specification No. 2600 shall apply to excavating, installing bedding, and backfilling all trench excavation construction necessary for the completion of work, except as modified herein.
1. All reference to Mn/DOT specification shall mean the specific edition, including Supplemental Specifications and Technical Memoranda as identified in Section 01420 of these Specifications.
 2. CEAM Specifications 2600.3 A3 Protection of Surface Structures:
 - (a) Street signs shall be considered as items of essential service
 - (b) The last sentence in the third paragraph is deleted.
 3. CEAM Specification 2600.3.A5 removal of Surface Improvements- All rubble and debris to be disposed of off-site, shall be disposed of at a location secured by the contractor and in a manner in compliance with applicable Local, State, and Federal regulations.
 4. CEAM Specification 2600.3.B3 Excavation Limits and Requirements- OSHA limitations shall also apply to the top of trench width determination. The seven day written notice is waived if changing soil conditions and OSHA compliance apply.
 5. CEAM 2600.3.C1 Jacking/Boring- The contractor is responsible for protecting all existing utilities above the elevation of the pipe invert minus 2 times the wall thickness of the casing pipe being installed. In addition, bentonite materials shall not be permitted to flow back into the excavation during the non-open cut construction.
 6. CEAM 2600.3.F1 Turf Resoration is hereby deleted, See Section 02920 of these Specifications.
 7. CEAM 2600.4 Method of Measurement Paragraphs B and C are hereby deleted. See applicable sections of these specifications.
- B. Reference Mn/DOT specification No. 2451 shall apply to granular materials for foundation, bedding and encasement of utility line construction, except as modified herein.
- C. Unless noted otherwise, the provisions in this section are in addition to the Referenced specification.

1.03 SUBMITTALS

- A. No exception to the referenced specification is made.

PART 2—PRODUCTS

3.01 GRANULAR MATERIALS

- A. Aggregate Bedding- Granular foundation material (rock) shall meet MnDOT specification 2451 for aggregate bedding as modified below. This material may be required for stabilization of the foundation below the pipe bottom, around the pipe fittings and under fire hydrants. This material shall be crushed rock meeting the following gradation by weight. The use of the material shall be reviewed by the Engineer prior to the installation of the material.

Sieve Size	Percent Passing
1 1/2"	95 – 100
3/4"	20 – 60
#4	0 – 5

- B. Granular Bedding – Granular backfill material to be used above the pipe zone up to the top of subgrade to replace unsuitable native material shall conform with MnDOT Specification 3138, Class 3, modified to permit the following gradation limits. The use of the material shall be reviewed by the Engineer prior to its use.

Sieve Size	Percent Passing
1 1/2"	100
#4	35 – 100
#10	20 – 80
#40	5 – 40
#200	0 – 15

- C. Granular Bedding and Encasement – Bedding and encasement materials used in the pipe zone area (6-inches below to 12-inches over the pipe) shall meet the same gradation and specification as granular backfill.

PART 3 – EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. Temporary Service

1. It will be necessary to maintain utility service during the construction period. Before proceeding with the project, the Contractor shall establish a work plan and submit the plan to the appropriate utility personnel and the Engineer for review and comment. The plan shall outline the method to be used to maintain service to the affected consumers and estimate the duration of any anticipated interruptions

of service. The Contractor is the sole party responsible to notify the Utility and consumers who may be affected by limitations and/or interruptions of utility service.

2. Planned service interruptions shall not exceed six (6) hours in any 72 hour period unless previously approved by the Utility.
3. If needed, the Contractor shall furnish, install and maintain equipment to bypass and control the storm and/or sanitary sewer flow around the construction zone. Failure to operate and maintain the bypass equipment could result in direct damage claims as well as consequential damage claims to the Contractor.

3.02 EXCAVATION AND PREPARATION OF TRENCH

A. Interference and Protection of Underground Structures

1. If an existing utility is shown on the plans and there is no bid item for removing and restoring, or working around the utility, the Contractor shall be required to remove and restore, or protect the utility.
2. The inverts of existing sewers (sanitary and storm), culverts, subdrains, etc. shall be protected during construction. The Contractor is responsible to inspect and clean, if necessary, all line which have been compromised by the construction operations.

B. Excavation Limits and Requirements

1. The trench for all flexible pipe shall be undercut six-inches below the pipe barrel to permit the installation of granular bedding or foundation material.
2. The trench for all rigid pipe shall be undercut three-inches below the pipe barrel to permit the installation of granular bedding or foundation material.
3. The Contractor shall install and operate a dewatering system to maintain all trenches free of water whenever necessary. The Contractor shall make his own subsurface investigations and determine what dewatering methods to utilize to prevent such damage.
4. The Contractor shall be responsible for any damage to adjacent structures or buildings caused by the dewatering operations.
5. Use of granular foundation material in lieu of dewatering is permitted, at the Contractor's expense unless previously approved by the Engineer.

C. Preparation and Maintenance of Foundation

1. Flexible Pipe Materials
 - a) In ordinary trench conditions, the pipe shall be bedded in compacted granular bedding which extends from six-inches below the bottom of the pipe to the spring line of the pipe. The Contractor shall bed and encase the pipe in ASTM

Class II bedding and haunching material compacted to 95% Standard Proctor Density or as recommended by the pipe manufacturer, whichever is denser.

- b) Where the trench foundation material has been found to be unstable and not suitable for bedding, the Contractor shall install compacted aggregate foundation material from 6-inches below the bottom of the pipe to the bottom of the pipe. Bedding material shall then be placed to the spring line of the pipe.

2. Rigid Pipe Materials

- a) In ordinary trench conditions, the pipe shall be bedded in compacted granular bedding which extends from three-inches below the bottom of the pipe to the spring line of the pipe. The Contractor shall bed and encase the pipe in ASTM Class II bedding and haunching material compacted to 95% Standard Proctor Density or as recommended by the pipe manufacturer, whichever is denser.
- b) Where the trench foundation material has been found to be unstable and not suitable for bedding, the trench shall be undercut until acceptable conditions are found. The Contractor shall then install compacted aggregate foundation material to meet the line and grade specified on the plans.

3.03 INSTALLATION OF PIPE AND FITTINGS

- A. The contractor shall keep accurate records as to the location of the service connections, field tile, utility crossings, etc. either constructed or encountered during construction. Measurements to service lines shall be taken from the nearest downstream manhole as directed by the Engineer. Measurements shall be written of a field set of plans and these plans given to the Engineer when all pipe work is completed. Final payment for the project will not be made until the information is in the possession of the Owner.
- B. When connection to an existing conduit is required at an existing or proposed manhole, The Contractor shall expose and verify the elevation of the existing conduit prior to laying any pipe toward, or away from, the connection point. If the elevation of the existing conduit does not match the elevation shown on the plans, the Contractor shall notify the Engineer, at which time the Engineer may adjust the proposed grades.
- C. Bulkheading Open Pipe Ends
 - 1. The Contractor shall furnish, install and maintain a temporary, water tight plug adequately blocked in place to prevent flooding of the existing downstream sewer system. The plug shall be placed at the beginning of the project or at the end of each working day's operation.
 - 2. When flows are diverted from an existing sewer or tile that is to be abandoned in place, the Contractor shall construct a water-tight plug on the end of the abandoned pipe.
 - 3. Permanent water-tight plugs shall be constructed with an approved concrete grout with a thickness of not less than one pipe diameter.

3.04 BACKFILLING OPERATIONS

A. Flexible Pipe Materials

1. Granular material shall be furnished, placed and compacted to bed and encase the pipe to an elevation 12 inches above the pipe bell the full width of the trench. If the depth of cover becomes critical according to the manufacturers recommendations, the Contractor shall be and encase the pipe in ASTM Class II bedding and haunching material compacted to 95% Standard Proctor Density or as recommended by the pipe manufacturer, whichever is denser.

B. All trench backfill shall be compacted in accordance with the Specified Density Method.

1. Compaction under areas with proposed pavement or structural improvements:
 - a) From the proposed pavement subgrade down 3 feet compact to 100% Standard Proctor Density.
 - b) From the bottom of the excavation up to within 3 feet of the proposed pavement subgrade compact to 95% Standard Proctor Density.
2. Compaction under areas without proposed pavement or structural improvements:
 - a) Compact to 95% Standard Proctor Density

3.05 FIELD QUALITY CONTROL

A. The Contractor shall arrange for having the following testing performed:

1. One (1) compaction test per each 300 linear feet of trench per 3 feet of depth. Compaction tests shall be taken on a daily basis as backfill progresses. In no case shall compaction tests be taken after all backfill operations are complete except for those tests of the finished pavement or structure subgrade.
2. Standard Proctors shall be taken at appropriate times as soil conditions vary.

B. Samples for testing shall be taken from material in place, in the trench locations approved by the Engineer. All sampling methods shall be approved by the Engineer.

C. Should any of the specified tests fail, the Contractor may arrange and pay for additional tests as may be necessary to satisfy the Engineer that the requirements have been met.

END OF SECTION

- C. Unless otherwise noted, the provisions in this section are in addition to the referenced specification.

PART 2 - PRODUCTS

2.01 WATER MAIN

- A. The following water pipe materials will be allowed on this project:

1. Ductile Iron Pipe (DIP) Class 52 for 4" to 10" Diameters and Class 50 For 12" to 16" Diameters.
2. Polyvinyl Chloride (PVC) pressure pipe complying with AWWA - C900 (DR18) or C905 (DR25), depending on size, for 150 and 165 working pressures, respectively.

2.02 WATER MAIN FITTINGS

- D. The following water main fitting materials will be allowed for use on this project:

1. Mechanical joint Class 350 ductile iron cement lined fittings shall be used. Adaptors, back-up rings, and oversize sleeves shall be provided for transitions and connections to dissimilar types of water main pipe materials. All water main sleeve fittings shall be long mechanical joint.
2. All fittings, valves, hydrants and retaining rods shall be protected by using sacrificial zinc anode caps such as 175P190 Protecto Caps as manufactured by Ebac Iron or an approved equal. Contractors shall supply 2 Protecto Caps per mechanical joint gland installed.
3. All fittings, valves, hydrants, etc. shall be installed using COR-BLUE T-BOLTS as manufactured by NSS Industries or an approved equal.

2.03 FIRE HYDRANTS

- A. Hydrants shall be Waterous Improved Pacer Style, Model WB-67, with safety flange and stem coupling. The bury depth shall be 8'-6" with 16-inch breakoff. A hydra-finder red and white stripe flag shall be included. The Contractor shall install the hydrant so that the center of the nozzle is 24-inches above the finished grade.
- B. All hydrants shall have been manufactured in the year of construction or prior calendar year.
- C. The local fire department shall be contacted before ordering hydrants to obtain the correct nozzle threads and type of operating nut and cap bolts.

2.04 VALVES AND VALVE HOUSINGS

- D. Valve Housing

1. Cast iron screw type valve boxes shall be installed where indicated on underground valves. The cast iron valve boxes shall be either two piece or three piece style and shall be furnished with a stay-put cover with raised letters indicating "WATER". The shaft shall be 5 1/4" inside diameter.
2. All valve boxes shall be furnished with a valve umbrella anchorage assembly. The valve anchorage assembly shall be manufactured by Adaptor, Inc., Oak Crest, WI, or approved equal.
3. Gate valve extension stem with 2-inch square nut shall extend to 1 foot of surface.

B. Gate Valves

1. All valves up to and including 12 inch diameter shall be gate valves conforming to the referenced specification.

C. Butterfly Valves

1. All valves 16-inch in diameter and larger shall be butterfly valves conforming to the referenced specification.

2.05 WATER SERVICE PIPE AND FITTINGS

A. Fittings

1. Water service pipe and fittings shall conform to the provisions of CEAM 2611.2D and the following:
 - a) Saddles shall be provided for all corporation stops larger than 1 1/2 inches.
 - b) The water service materials style commonly used by the City Utility are:

ITEM	MAIN TYPE	FORD	A.Y. MCDONALD
Corporation Stop	DIP	FB600-3	4701BT
Service Saddle For 1 1/2 inch & Larger	DIP	101B, 202B, or equal	3801
Curb Stop		B22-444M	6104
Curb Box		EM2-80-56, EM2-80-56-78R With 78 inch rod	5610 with 5607L with 78 inch rod

1. Curb boxes shall be eight feet long at full extension and shall be adjusted as required to match finished grade. Curb boxes shall be provided with a stationary rod.

2. All copper fittings shall be flared type. Compression type fittings will not be allowed.
3. The listed fittings are to be considered as a basis for quality. The City Utility should be contacted before ordering to verify the manufacturers' type and style.

A. RESTRAINING AND BLOCKING

A. Mega lugs

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE AND FITTINGS

A. Aligning and Fitting of Pipes

1. The contractor, together with the City Utility's personnel, shall jointly examine and operate all curb stops and gate valves prior to final acceptance.

B. Blocking and Anchoring of Pipe

1. A thrust block of cast-in-place concrete which covers the installed fitting, is not permitted. Pre-cast concrete thrust blocks and other restraining devices such as adjustable rods or cables, shall be provided at all bends, tees, hydrants and plugged crosses or wherever the water main changes direction or dead ends. Valves shall be tied to the nearest tee.

C. Polystyrene Insulation

1. The Contractor shall install polystyrene insulation in those area where the water main may be susceptible to frost or freezing, or as directed by the Engineer.

D. Water Service Installation

1. Field flaring shall be performed with current standards of the plumbing industry and manufacturer recommendations.
2. The Contractor shall keep accurate records as to the location of service connections, as specified in the reference specification. Final payment will not be made until the information is in the possession of the Owner.
3. No warranty is expressed or implied as to the location, size, or material type of existing service lines. The Contractor shall furnish and install all fittings required to make the connections.
4. The Contractor shall install new service pipe, at 8 foot bury depth, from the corporation stop to the property line, or as directed on the plans, or as directed by the Engineer.
5. The water services shall be constructed after the main has been hydrostatically tested and disinfected.

6. The corporation stops shall be opened prior to complete backfilling to verify that no leakage occurs at the service line.

3.02 FIELD QUALITY CONTROL

- A. No exception to the referenced specification is made unless a non-conductive water main is installed, in which case the conductivity requirements are deleted and the conductivity requirements shall be to determine the electrical continuity of the tracer wire.

3.03 HYDROSTATIC TESTING AND DISINFECTION

- A. Leakage tests shall be conducted at a 150 psig test pressure with no drop in pressure. Individual tests from valve to valve are required. These tests shall be conducted prior to the bacteriological tests required with the disinfection of the main.
- B. Water services, including corporation and curb stops, shall be tested. The Contractor may choose to include services at the time of water main testing (150 psig) or as a separate operation at a reduced pressure of 100 psig. If performed separately, testing shall be done with the corporation stops open.
- C. The Contractor shall disinfect the water main in accordance with the provisions of the AWWA Standard Specification C-651, Disinfecting Watermains. After performing and obtaining passing hydrostatic test results, two samples of the water, taken 24 hours apart, shall be taken from each section of the new pipe and sent to an approved testing laboratory to establish the bacteriological conditions prior to placing the line in service. In the event unsatisfactory results are obtained, the Contractor shall take whatever steps are necessary to correct the sanitary conditions. The Contractor shall then retake the bacteriological tests until a satisfactory result is obtained.

END OF SECTION

SECTION 02330 – SANITARY SEWERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all labor, materials, tools and equipment and performances of all work and services necessary or incidental to sanitary sewer and service lateral construction as shown on the Project Drawings and as specified herein.

1.2 RELATED WORK

- A. Section 02420: TRENCH EXCAVATION, BEDDING AND BACKFILL

1.3 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under SANITARY SEWERS shall be included in the lump sum price bid for the project.

- ~~B. The furnishing and installing of specific items and/or the performance of work under certain circumstances shall not be individually paid. The cost shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:~~

1. Locating and connecting to an existing sanitary sewer pipe, include in the unit price bid for sanitary sewer.
2. The cost of furnishing bends, adapters, cutting and removing the existing sanitary sewer pipe, include in the unit price bid for sanitary sewer.
3. Leakage and deflection testing, include in the unit price bid for sanitary sewer.
4. Wood and/or metal parts necessary to identify the ends of unattached service lines and sanitary sewer stub outs, include in the unit price bid for sanitary sewer lines.

1.03 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.04 REFERENCES

- A. Reference CEAM Specification No. 2621 shall apply to construction of gravity sewers and laterals, except as modified herein.
- B. Reference MnDOT Specification No. 2506 shall apply to manholes and castings, except as modified herein.
- C. Unless otherwise noted, the provisions in this section are in addition to the referenced

specification.

PART 2 - PRODUCTS

2.01 MANHOLES

A. Precast Concrete Manholes

1. Manholes shall conform to MnDOT Standard Plate No. 4007C, unless otherwise shown on the plans, including integral base sections and rubber gasketed tongue and groove joints. All pipe openings shall have integral cast watertight seal.
2. Reinforced polypropylene plastic steps shall be furnished for all sanitary sewer manholes four or more feet in depth.

B. Castings

1. All casting assemblies shall meet the certification requirements of the Minnesota Department of Transportation and be manufactured by a MnDOT approved source.
2. Castings shall be Neenah R-1642-B self-sealing lid with concealed pick hole.

C. Adjusting Rings

1. Concrete or high-density polyethylene adjusting rings shall be used.

2.02 PIPE AND FITTINGS

- A. 4" through 6" Diameters: Smooth walled polyvinyl chloride pipe and fittings shall conform with the requirements of ASTM D-3034 for the size, standard dimension ratio (SDR) of 26, unless specified otherwise on the plans. The grade used shall be resistant to aggressive soils or corrosive substances in accordance with the requirements of ASTM D-543.
- B. 8" through 15" Diameters: Smooth walled polyvinyl chloride pipe and fittings shall conform with the requirements of ASTM D-3034 for the size, standard dimension ratio (SDR 35) for depths of up to 20 feet, and SDR 26 for depths exceeding 20'. Connections shall be push-on with elastomeric gasketed joints which are bonded to the inner wall of the gasket recess of the bell socket.
- C. Water tight gaskets shall be used where pipes enter or exit manholes.
- D. All wyes and tees shall be heavy duty.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE AND FITTINGS

A. Sanitary Sewer Main Installation

1. No exception to the referenced specification is made.

B. Sanitary Sewer Service Installation

1. The contractor shall dye water test all existing sanitary sewer service line connections cut, severed or encountered during construction to determine if they are still active. Those service lines that are no longer active shall be abandoned by plugging the severed upstream end with a suitable watertight plug.
2. The Contractor shall keep accurate records as to the location of the service connections constructed. Measurements to service lines shall be taken from the down stream manhole and include the perpendicular distance from the sanitary sewer main to the end of the service line.
3. The Contractor shall furnish and install a wood or metal stake that extends from the end of the service pipe to the ground surface. If a wood stake is used, a 12 square inch metal plate capable of being located with a metal detector, shall be attached to the wood stake just below the ground surface.

3.02 INSTALLATION OF MANHOLE STRUCTURES

A. Connect to Existing Sanitary Sewer

1. When a connection to an existing sanitary sewer is made at an existing or proposed manhole, the Contractor shall expose and verify the elevation of the existing sewer invert prior to laying any sanitary sewer to or from the connection point. If the elevation of the existing elevation shown on the plans, the Contractor shall notify the Engineer.

B. Raise/Lower Existing Manhole

1. Raising and/or lowering an existing manhole to meet a proposed finished rim elevation is performed when the addition or deletion of 2-inch adjusting rings will not reach a minimum of 2 rings or exceed a maximum of 6 rings. Typically it will require: the removal of the manhole cone section or the concrete slab top; the addition, removal or exchange of barrel sections; the replacement of the cone section or concrete slab top; the installation of the proper number of adjusting rings; and the replacement of the manhole casting and frame.

C. Outside Drop Manhole

1. All pipe materials used to construct the incoming pipe and the drop section shall be ductile iron.
2. Ductile iron pipe shall extend from the tee to 2 feet beyond the point where the elevation of the virgin soil becomes a uniform 6-inches above the invert of the incoming pipe.

D. Adjusting Rings

1. If concrete adjusting rings are used, they shall be set with bituminous mastic or cement mortar and shall be plastered inside and out, with a minimum thickness of 1/2-inch of mortar. A maximum of 3 individual adjusting rings shall be used. Taller 6-inch or 12-inch rings shall be used where adjustment requires more than three 2-inch rings.
2. If HDPE adjusting rings are used, the sealant material and method shall be approved by the Engineer prior to their installation.

3.03 FIELD QUALITY CONTROL

A. Deflection Test

1. No exception to the referenced specification is made.

B. Sanitary sewer leakage testing.

1. Leakage tests are not required where existing services are connected directly to the new sanitary sewer as it is being constructed.

C. Air Testing

1. No exception to the referenced specification is made.

D. Televising

1. Televising is required after the installation and backfill are complete.
2. Immediately prior to televising, the televisor shall discharge sufficient clear water into the pipe to assist in identifying sags and improper alignment.
3. Televising shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by closed circuit television. The interior of the pipe shall be carefully inspected to determine the location of any conditions which may indicate improper installation.
4. A video tape and suitable log shall be kept and submitted to the Engineer.

END OF SECTION

SECTION 02350 - STORM SEWERS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all labor, materials, tools and equipment and performances of all work and services necessary or incidental to storm sewer construction as shown on the Project Drawings and as specified herein.

A. RELATED WORK

- A. Section 02420: TRENCH EXCAVATION, BEDDING AND BACKFILL

B. METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under STORM SEWERS shall be included in the lump sum price bid for the project

- B. The furnishing and installing of specific items and/or the performance of work under certain circumstances shall not be individually paid. The cost shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:

1. Locating and connecting to an existing storm sewer pipe, include in the unit price bid for storm sewer.
2. The cost of furnishing bends, adapters, cutting and removing the existing storm sewer pipe, include in the unit price bid for storm sewer.
3. Deflection testing, include in the unit price bid for storm sewer.
4. Wood and/or metal parts, necessary to identify the ends of storm sewer stub-outs, include in the unit price bid for storm sewer lines.
5. Connecting to existing storm sewer structures or pipes.
6. Use of geo-textile fabric to wrap pipe joints in lieu of using mastic, include in the unit price bid for Storm sewer.
7. Maintenance of an appropriate storm water outlet during construction, include in the unit price bid for storm sewer.

C. MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.05 REFERENCES

- A. Reference CEAM Specification No. 2621 shall apply to construction of pipe sewers, except as modified herein.
- B. Reference MnDOT Specification No. 2506 shall apply to manholes and castings, except as modified herein.
- C. Reference MnDOT Standard Plates Manual with latest revisions
- D. Unless otherwise noted, the provisions in this section are in addition to the referenced specification.

PART 2 - PRODUCTS

2.01 MANHOLES

- A. Precast Concrete Manholes and Catch Basin Sections
 - 1. Manholes shall conform to MnDOT Standard for the design type as shown on the plans.
 - 2. Reinforced polypropylene plastic steps shall be furnished for all sanitary sewer manholes four or more feet in depth.
- B. Castings
 - 1. All casting assemblies shall meet the certification requirements of the Minnesota Department of Transportation and be manufactured by a MnDOT approved source.
 - 2. Manhole castings shall be MnDOT 700-7 frame with MnDOT 712 cover, with center pick hole, unless otherwise specified on the plans.
 - 3. Catch Basin castings assemblies shall be the type shown on the plans.
- C. Adjusting Rings
 - 1. Concrete or high-density polyethylene adjusting rings shall be used.

2.02 PIPE AND FITTINGS

- A. Reinforced Concrete Pipe (MnDOT 3236)
 - 1. All pipe shall be gasketed joints.
- B. Solid Wall Polyvinyl Chloride (PVC) Pipe (MnDOT 3245)
 - 1. 8" through 15" Diameters: Smooth walled polyvinyl chloride pipe and fittings shall conform with the requirements of ASTM D-3034 for the size, standard dimension ratio (SDR 26) with elastomeric gasketed joints which are bonded to the inner wall of the gasket recess of the bell socket.

C. Profile Wall Polyvinyl Chloride (PVC) Pipe

1. 12" through 48" Diameters: Profile wall polyvinyl chloride pipe shall conform to the requirements of ASTM F949 Specifications.
2. Joints shall be elastomeric gasketed type which are bonded to the inner wall of the gasket recess of the bell socket.

D. Corrugated Polyethylene Pipe (CPE) and Fittings

1. Dual-wall corrugated polyethylene pipe shall conform to the requirements of AASHTO M294 and Design Section 18 of the AASHTO Standard Specifications for Highway Bridges except as modified as follows. Minimum wall thickness for 12 and 15 inch diameter pipe shall be 0.035 inches and for 18 and 24 inch diameter pipe shall be 0.05 inches.
2. Joints shall be coupled to provide a water-tight joint unless noted otherwise on the drawings or in these specifications.

E. Geo-textile Fabric

1. MnDOT 3733, Type IV shall be used at all pipe apron outlets.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE AND FITTINGS

A. Storm Sewer Installation

1. No exception to the referenced specification is made.
2. The Contractor shall keep accurate records as to the location and elevation of all stub-outs constructed. Measurements to stub-outs shall be taken from the down stream structure and include the perpendicular distance from the storm sewer main to the end of the stub-out line.
3. The Contractor shall furnish and install a wood or metal stake that extends from the end of all stubbed out pipe to the ground surface. If a wood stake is used, a 12 square inch metal plate capable of being located with a metal detector, shall be attached to the wood stake just below the ground surface.

3.02 INSTALLATION OF MANHOLE STRUCTURES

A. Connect to Existing Storm Sewer

1. When a connection to an existing storm sewer is made at an existing or proposed manhole or stubbed out pipe, the Contractor shall expose and verify the elevation of the existing sewer invert prior to laying any storm sewer to or from the connection point. If

END OF SECTION

1. No exception to the referenced specification is made.

A. Deflection Test

3.03 FIELD QUALITY CONTROL

manhole casting and frame.
the installation of the proper number of adjusting rings; and the replacement of the
exchange of barrel sections; the replacement of the cone section or concrete slab top;
removal of the manhole cone section or the concrete slab top; the addition, removal or
minimum of 2 rings or exceed a maximum of 6 rings. Typically it will require: the
is performed when the addition or deletion of 2-inch adjusting rings will not reach a
proposed finished rim elevation to meet a proposed finished rim elevation

1.

C. Raise/Lower Existing Manhole

be approved by the Engineer prior to their installation.
2. If HDPE adjusting rings are used, the sealant material and method of installation shall
inch rings shall be used where adjustment requires more than three 2-inch rings.
mortar. A maximum of 3 individual adjusting rings shall be used. Taller 6-inch or 12-
mortar and shall be plastered inside and out, with a minimum thickness of 1/2-inch of
If concrete adjusting rings are used, they shall be set with bituminous mastic or cement
1.

1.

B. Adjusting Rings

the elevation of the existing pipe varies from that shown on the plans, the Contractor
shall notify the Engineer.

SECTION 02505 - EXCAVATION AND EMBANKMENT -

PART 1—GENERAL

1.01 SUMMARY

- A. This section covers the furnishing of all labor, materials, tools, equipment and all work and services necessary or incidental to the excavation and embankment necessary to construct roadways and pavements, as indicated on the drawings or as specified herein.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under EXCAVATION AND EMBANKMENT-ROADWAY & SITE GRADING shall be included in the lump sum price bid for the project.

1.3 SPECIFICATION REFERENCES

- A. Reference Mn/DOT specification No. 2105 shall apply to excavation and embankment construction, except as modified herein.
- B. Unless noted otherwise, the provisions in this section are in addition to the Referenced specification.

1.03 SUBMITTALS

- A. No exception to the referenced specification is made.

PART 2—PRODUCTS

2.01 MATERIALS

- A. All excess excavated material shall remain the property of the Owner and shall be placed in the central commercial area or stockpiled by the Contractor on site.
- B. Stabilizing aggregates for use in backfilling subgrade excavations shall be material generally produced and referred to as "1 1/2 -inch dust free aggregate" or other coarse aggregate found to be in general compliance by the Engineer. Aggregate base, Class 5 may also be used at the direction of the Engineer.

PART 3—EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. At the end of each day the contractor shall eliminate surface indentations, including those caused by sheeps foot rollers and tractor cletes, and roll the surface with a steel wheel or rubber-tired roller.
- B. Subgrade excavation shall be performed, as directed by the Engineer, for the removal of unstable soils which may be encountered. Such excavation shall be bacfilled with suitable excess common excavation material or stabilizing aggregate as directed by the Engineer. If

the Contractor proceeds without approval from the Engineer or Owner, all work and material to restore the roadbed to the proper grade shall be at the Contractor's expense.

- C. Once the subgrade has been test rolled and accepted by the Engineer, no traffic or construction equipment shall be permitted to operate directly on the subgrade without the approval of the Engineer.
- D. Material suitable for curb backfill shall be segregated and stockpiled at a site selected by the Contractor. Following curb construction, the material shall be placed behind the curb to the subgrade level of the topsoil.
- E. The Contractor shall salvage and stockpile all topsoil, including sod, removed during the course of the construction. This topsoil shall be used where required for turf establishment as directed by the Engineer.
- F. Sufficient excavated material shall be utilized by the Contractor to replace loss volume due to soil shrinkage from trench excavation which may occur through the course of construction. The Contractor shall make his own determination of the amount of shrinkage that will occur.
- G. All embankment shall be compacted using the Specified Density Method:
 - 1. Compaction under proposed pavement or structural improvements (entire site):
 - a) Compact to 95% Standard Proctor Density

3.02 FIELD QUALITY CONTROL

- A. "Blue top" stakes shall be provided by the Contractor to confirm that the subgrade is constructed to the required grades and elevations. Methods other than "blue top" staking may be allowed, if approved by the Engineer.
- B. The Contractor shall arrange and pay for all costs associated with having the following tests performed:
 - 1. Approximately one (1) compaction test per each 10,000 square feet of fill subgrade areas at 2 foot depth intervals.
 - 2. Standard Proctors shall be taken at appropriate times as soil conditions vary.
- C. Samples for testing shall be taken from material in place, in the trench locations approved by the Engineer. All sampling methods shall be approved by the Engineer.
- D. The Contractor shall cooperate fully with the RPR and individuals performing the tests.

END OF SECTION

SECTION 02510 - SUBGRADE PREPARATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to the subgrade preparation as indicated in the plans or as specified herein.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under SUBGRADE PREPARATION shall be included in the lump sum price bid for the project:

- 1. No exception to the referenced specification is made.

- B. The furnishing and installing of specific items and or the performance of work under certain circumstances shall not be individually paid. The costs shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:

- 1. Drying or adding water to the subgrade to establish proper water content for compaction.

- 2. Subgrade excavation, furnishing stabilizing aggregate, installation of geo-textile fabric, compaction, regarding and/or other efforts necessary to repair the subgrade after satisfying the rolling test and failing to protect the integrity of the subgrade.

1.03 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.04 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 2112, shall apply to the subgrade preparation, except as modified herein.

- B. Unless otherwise noted, the provisions in this Section are in addition to the referenced specification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. No exception to the referenced specification is made.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. At the end of each day the contractor shall eliminate surface indentations, including those caused by sheeps foot rollers and tractor cletes, and roll the surface with a steel wheel or rubber-tired roller.
- B. The Contractor shall disc, scarify, shape and compact the upper six inches of the street subgrade or existing base, adding water or drying as may be necessary to give uniform and desired densnity.
- C. If the subgrade is unstable and the instability is due to excessive moisture, the subgrade shall be scarified and dried over a reasonable time period. When the material has reached acceptable moisture limits, the material shall be returned to the roadbed and compacted into place to the proper evaluation. The roadbed will once again be test rolled. If the material continues to be unstable, the Engineer may authorize the removal of the undesirable material as subgrade excavation.
- D. Once the subgrade has been test rolled and accepted by the Engineer, no traffic or construction equipment shall be permitted to operate directly on the subgrade without the prior approval of the Engineer. All equipment shall be restricted to operating only in areas where the aggregate base has been installed to its full design depth.
- E. The subgrade shall be compacted in accordance with the Specified Density Method :
 - 1. Under areas with proposed paved or structural improvements:
 - (a) 100% Standard Proctor from the proposed pavement subgrade elevation down 3 feet.
 - (b) 95% Standard Proctor from the bottom of excavation up to 3 feed below the subgrade elevation
 - 2. Under areas with no proposed paved or structural improvements:
 - (a) 95% Standard Proctor

3.1 FIELD QUALITY CONTROL

- A. "Blue top" stakes shall be provided the Contractor at 100 foot intervals to confirm that the sugrade is constructed to the required grades and elevations. Methods other than "blue top" staking may be allowed, if approved by the Engineer.
- B. The compacted subgrade shall be test rolled using a fully loaded aggregate truck (tandem) ina pattern approved by the Engineer. The subgrade stability shall be considered adequate when the surface shows less than one (1) inch of yielding or rutting after one pass, or as otherwise approved by the Engineer.
- C. The Contractor shall arrange for and pay all costs associated with having the following testing

performed:

1. One (1) compaction test (including Standard Proctor) on subgrade per LF of roadway.
- D. The contractor shall cooperate fully with the individuals performing the tests.
- E. Samples for testing shall be taken from material in place, in the roadway at locations approved by the Engineer. All sampling methods shall be approved by the Engineer.
- F. Should any of the specified tests fail, the Contractor may arrange and pay for additional tests as may be necessary to satisfy the Engineer that the requirements have been met.

END OF SECTION

SECTION 02520 - AGGREGATE BASE

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to the construction of the aggregate base as indicated in the plans or as specified herein.
- B. The Contractor shall protect existing improvements and previously accepted in-process improvements from damage. Contractor shall repair all existing and previously accepted in-process improvements damaged during construction of the aggregate base at no cost to the Owner.
- C. The Contractor shall repair, at no cost to the Owner, any damage to the subgrade including but not limited to subgrade excavation, furnishing stabilizing aggregate, geotextile fabric installation, compaction and regrading, once the rolling test is satisfied and failing to protect the subgrade

1.02 RELATED WORK

- A. Section 02200: Preparation of subgrade below base course surfaces.

1.03 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under AGGREGATE BASE shall be included in the lump sum price bid for the project and shall include all measures needed to comply with these plans.

Such items of work include but are not limited to:

- 1. Protecting existing improvements and previously accepted in-process improvements from damage.
- 2. Subgrade excavation, furnishing stabilizing aggregate, geo-textile fabric installation, compaction, regarding and/or other efforts necessary to repair the subgrade after satisfying the rolling test and failing to protect the integrity of the subgrade.
- 3. Gradation and compaction testing to meet the requirements of Source and Field Quality Control, as required.

1.04 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.04 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 2211, Aggregate Base, shall apply to the construction of aggregate base, except as modified herein.
- B. Unless otherwise noted, the provisions in this Section are in addition to the referenced specification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The material to be used for Class 5 Aggregate Base shall be modified so that the percent passing the No. 200 sieve shall be 5 to 10 percent.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. The Contractor shall eliminate all surface indentations, including those caused by a sheeps foot roller or tractor cleats, and roll the surface with a smooth drum steel wheel or rubber tired roller at the end of each day.
- B. Aggregate base from the bottom of the excavation up to within 3 feet below the subgrade elevation and all aggregate base outside the paved or structural improvements shall be compacted to 95% Standard Proctor using the Specified Density Method.
- C. Aggregate base under proposed structural or paved improvements from 3 feet below the subgrade to the surface shall be compacted to 100% Standard Proctor using the Specified Density Method.
- D. Aggregate base construction shall not take place until the street subgrade condition and grade have been examined by the Engineer.

3.02 SOURCE QUALITY CONTROL

- A. The Contractor shall provide one (1) gradation test for each 1000 tons or 500 cubic yards (CV) of each class of aggregate base. A minimum of one gradation test per each class of aggregate base is required.

3.03 FIELD QUALITY CONTROL

- A. The Contractor shall have one (1) compaction test performed (including a corresponding Standard Proctor) for each 200 LF of street or 6000 SF of aggregate base placed at two (2) foot elevation intervals.
- B. If any tests prove deficient, the Contractor may, at their own expense, may arrange for additional tests as may be necessary to satisfy the Engineer that the requirements have been met.
- C. The Contractor shall cooperate fully with the individuals performing the tests.

- D. Sample locations and sampling method shall be approved by the Engineer.
- E. Blue Top stakes shall be provided by the Contractor at 100 foot intervals to confirm that the aggregate base is constructed to the required grades and elevations. Methods other than Blue Top staking may be allowed, if approved by the Engineer.

END OF SECTION

SECTION 02530 - PLANT-MIXED BITUMINOUS PAVING

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to the construction of plant-mixed bituminous paving as indicated in the plans or as specified herein.
- B. Include saw cutting of existing paving necessary to provide a straight, uniform edge at areas where removal and replacement of bituminous paving is required to complete work indicated.
- C. This is a certified plant project. The Contractor shall have sufficient testing facilities and qualified personnel including Certified Technicians.

1.02 RELATED WORK

- A. Section 02200: Preparation of subgrade below base course surfaces.
- B. Section 02720: Aggregate Base
- C. Section 02745: Bituminous Tack Coat

1.03 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under PLANT MIXED BITUMINOUS PAVING shall be included in the lump sum price bid for the project and shall include all measures needed to comply with these plans.

1.04 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.05 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 2350, Plant Mixed Asphalt Pavement, shall apply to the construction of plant-mixed bituminous surfacing, except as modified herein. A copy of Standard Specification 2350 is available from the Engineer upon request.
- B. Unless otherwise noted, the provisions in this Section are in addition to the referenced specification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. No recycled materials shall be allowed in the bituminous wearing course.
- B. Bituminous material for the mixture shall be PG 58-28 asphalt cement.
- C. The wear mix shall be produced with gradation 3 aggregate for lifts of 1 ½" or more and shall be produced with gradation 4 aggregate for lifts of less than 1 ½".

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. The Contractor is required to use the self-propelled pneumatic tire roller as an intermediate roller on the wearing course.
- B. The bituminous surfacing shall be constructed with maximum deviation of plus or minus ¼" from the planned compacted thickness.
- C. The contact surfaces of all fixed structures, the edge of the in-place mixture in all courses at transverse joints, and the wearing course at longitudinal joints shall be given a uniform coating of Liquid Asphalt or Emulsified Asphalt before placing the adjoining mixture. The bituminous material shall be applied by methods that will ensure uniform coating and shall not be excessive.
- D. Compaction of all bituminous mixtures shall be by the Maximum Density Method.

3.02 SOURCE QUALITY CONTROL

- A. The bituminous mix shall be designed using Contractor Trial Mix Designs. A current MnDOT mix design may be accepted if it represents the aggregate source and bituminous plant being used for the project and is approved by the Engineer. No bituminous mixture shall be placed without an approved mix design.

3.03 FIELD QUALITY CONTROL

- A. Three (3) inch diameter cores shall be taken by the Contractor to verify the thickness of the compacted finished bituminous pavement as engineer deems necessary. Sample locations shall be designated by the Engineer and made with a coring device that produces clean, sharp, vertical edges.
- B. If any samples prove deficient, the Contractor may, at their own expense, take additional core samples to further define the extent of the deficiencies.
- C. The Engineer shall calculate deficient pavement areas using the locations and thickness results of all cores and prorating the thickness profile. A \$0.50 deduction per square yard will be made for each 1/8-inch deficiency of thickness beyond the specified tolerances.
- D. Reduction in payment for bituminous courses constructed to more than the maximum permissible thickness shall be in accordance with MnDOT Section 2350.7, except that the thickness tolerances specified herein apply.

E. Testing:

Quantity per Mixture Type	Required Contractor Testing			Owner Arranged Assurance Testing			
	VMA & Air Voids	Gradation	Spot Check	VMA & Air Voids	Gradation	Spot Check	Extraction
0-500 Ton	2	1	1	1	1		1
500-1000 Ton	3	1	1	1	1		1
1000+ Ton	4 First Day 1/1000 Ton Thereafter With Min. 2/Day	2/Day	2/Day	1	1	1	1

END OF SECTION

SECTION 02730 – CONCRETE CURB AND GUTTER & DRIVEWAY

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to the construction of concrete curbing and driveway pavement as indicated in the plans or as specified herein.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. A. The furnishing and installation of specific items and/or the performance of work under CONCRETE CURB GUTTER AND DRIVEWAY shall be included in the lump sum price bid for the project and shall include all measures needed to comply with these plans.
- B. The furnishing and installing of specific items and/or the performance of work under certain conditions shall not be individually paid. The costs shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:
 - 1. Subcutting and shaping the existing aggregate base.
 - 2. Aggregate base placed under concrete pavements.
 - 3. Addition of aggregate base for shaping.
 - 4. Cold weather concrete protection methods and materials required.
 - 5. High early strength concrete.
 - 6. Providing adequate barricades and personnel to protect fresh concrete from pedestrian traffic and graffiti.
 - 7. Providing temporary walkways spanning fresh concrete where it is required to maintain access to building entrances.

1.03 RELATED WORK

- B. Section 02200: Preparation of subgrade below base course surfaces.
- C. Section 02720: Aggregate Base

1.04 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.05 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 2531 shall apply to the construction of concrete curb and gutter and concrete driveway, except as modified herein.
- B. Unless otherwise noted, the provisions in this Section are in addition to the referenced specification.
- C. MnDOT Standard Plates.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The concrete mix used shall conform to MnDOT Mix No. 3A32 for manually placed concrete or Mix No. 3A22 for machine place concrete.
- B. Fifty percent of the coarse aggregate shall be Class A material as specified in MnDOT Specification 3137.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. The width of all driveways shall be established in the field by the project Engineer or Owner.
- B. The joints in the driveway pavement shall match with the sidewalk and curb control joints. The Contractor shall be fully responsible for proper jointing patterns. Mismatched jointing will require removal and replacement of components in order to achieve the desired results. All removal and replacement of rejected construction shall be at the Contractor's expense.
- C. The tooling tolerances as outlined in MnDOT Specification 2531 for surface uniformity, alignment and jointing shall be reviewed by the Contractor prior to construction. Defects found during examinations will require the Contractor to remove and replace those areas found to be defective. No deduction in unit price will be acceptable to satisfy defective areas found.
- D. High early strength concrete shall be used for all driveway pavement.
- E. Excavate to the elevation shown on the detail plate. Salvage material suitable for backfill.
- F. Backfill along exposed edges of slabs and behind the curb with selected salvage material from the excavation to the elevation shown on the design detail plate.

- G. No warranty is expressed or implied that all concrete work will be accessible for machine construction.

3.02 SOURCE QUALITY CONTROL

- A. A current MnDot mix design may be accepted if it represents the aggregate source and concrete plant being used for the project and is approved by the Engineer. No concrete mixture shall be placed without an approved mix design.

3.03 FIELD QUALITY CONTROL

- A. The Contractor shall arrange and pay for the following concrete tests:
 - 1. One set of 3 concrete cylinders per 50 cubic yards of concrete placed per day. A minimum of one set of cylinders shall be cast for each day of concrete placement work. A concrete cylinder sample shall be compression tested at 7 and another at 21 days.
- B. If any samples prove deficient, the Contractor may, at their own expense, take core samples to further define the extent of the deficiencies.

END OF SECTION

SECTION 02765-PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to the application of the pavement markings as indicated in the plans or as specified herein.

1.02 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 3354, shall apply to pavement markings, except as modified herein.
- B. Unless otherwise noted, the provisions in this Section are in addition to the referenced specification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The material for paint shall meet FS TIP-85E.
- B. Paint shall be a non-bleeding, quick drying, alkyd petroleum base paint suitable for application of traffic bearing surfaces.
- C. Paint shall be mixed in accordance with manufacturers instructions prior to application.

2.02 EQUIPMENT

- A. Application equipment shall consist of a machine of the spray type capable of applying the material under pressure at a controlled temperature through nozzles equipped with remotely controlled cutoff mechanisms and suitable guides that will produce clean cut lines and prevent excessive material drift.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. The Contractor shall clean the pavement surface prior to the line application in a manner and to the extent required by the Engineer..
- B. Pavement markings shall be applied in seasonable weather when the air temperature is 50 degrees F or higher, and shall not be applied when the wind or other conditions cause a film of dust to be deposited on the pavement surface after cleaning and before the marking material can be applied.
- C. The Contractor shall take precautions so as to not spill paint material on pavement surfaces.

- D. All pavement striping shall be 4 inches wide, unless noted otherwise on the plans. All pavement striping shall be a minimum of 15 mils thick (wet thickness) at a rate of 100 square feet per gallon.
- E. All pavement markings not conforming to the requirements of the Contract shall be removed and replaced or otherwise repaired to the satisfaction of the Engineer. Removal of unacceptable work shall be accomplished with suitable blasting or grinding equipment unless other means are approved by the Engineer.
- F. Application of the marking material shall be such as to provide uniform film thickness throughout the coverage area. Stripe ends shall be clean cut and square, with a minimum of material beyond the cutoff.

END OF SECTION

SECTION 02775 - CONCRETE WALKS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to the construction of concrete walks as indicated in the plans or as specified herein.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under CONCRETE WALKS shall be included in the lump sum price bid for the project and shall include all measures needed to comply with these plans.
- B. The furnishing and installing of specific items and/or the performance of work under certain conditions shall not be individually paid. The costs shall be included in the lump sum price bid for the project. Such items of work include but are not limited to:

1. Subcutting and shaping the existing material to the required depth.
2. Aggregate base placed under concrete walks.
3. Cold weather concrete protection methods and materials required.
4. High early strength concrete.
5. Providing adequate barricades and personnel to protect fresh concrete from pedestrian traffic and graffiti.
6. Providing temporary walkways spanning fresh concrete where it is required to maintain access to building entrances.

1.02 RELATED WORK

- B. Section 02200: Preparation of subgrade below walk surfaces.
- C. Section 02720: Aggregate Base

1.03 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.04 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 2521 shall apply to the construction of concrete curb and gutter and concrete driveway, except as modified herein.
- B. Unless otherwise noted, the provisions in this Section are in addition to the referenced specification.
- C. MnDOT Standard Plates.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The concrete mix used shall conform to MnDOT Mix No. 3A32 for manually placed concrete or Mix No. 3A22 for machine place concrete.
- B. Fifty percent of the coarse aggregate shall be Class A material as specified in MnDOT Specification 3137.
- C. The foundation materials shall be Class 5, Aggregate Base.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. The width of all driveways shall be established in the field by the project Engineer or Owner.
- B. The joints in the driveway pavement shall match with the sidewalk and curb control joints. The Contractor shall be fully responsible for proper jointing patterns. Mismatched jointing will require removal and replacement of components in order to achieve the desired results. All removal and replacement of rejected construction shall be at the Contractor's expense.
- D. The tooling tolerances as outlined in MnDOT Specification 2531 for surface uniformity, alignment and jointing shall be reviewed by the Contractor prior to construction. Defects found during examinations will require the Contractor to remove and replace those areas found to be defective. No deduction in unit price will be acceptable to satisfy defective areas found.
- E. High early strength concrete shall be used for all driveway pavement.
- F. Excavate to the elevation shown on the detail plate. Salvage material suitable for backfill.
- G. Backfill along exposed edges of slabs and behind the curb with selected salvage material from

the excavation to the elevation shown on the design detail plate.

- H. No warranty is expressed or implied that all concrete work will be accessible for machine construction.

3.02 SOURCE QUALITY CONTROL

- A. A current MnDot mix design may be accepted if it represents the aggregate source and concrete plant being used for the project and is approved by the Engineer. No concrete mixture shall be placed without an approved mix design.

3.03 FIELD QUALITY CONTROL

- A. The Contractor shall arrange and pay for the following concrete tests:
 - 1. One set of 3 concrete cylinders per 50 cubic yards of concrete placed per day. A minimum of one set of cylinders shall be cast for each day of concrete placement work. A concrete cylinder sample shall be compression tested at 7 and another at 21 days.
- B. If any samples prove deficient, the Contractor may, at their own expense, take core samples to further define the extent of the deficiencies.

END OF SECTION

SECTION 02920 – TURF ESTABLISHMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide all materials, labor, tools, equipment and performances of all work and services necessary or incidental to Turf establishment as indicated in the plans or as specified herein or as directed by the Engineer.
- B. Several different seeding mixtures may be utilized on this project. The Contractor shall refer to the plan for the locations of the different turf establishment areas.
- C. Temporary seeding may be necessary during construction to prevent erosion of on site materials. The Contractor shall do temporary seeding work as specified herein or as directed by the Engineer and/or MPCA NPDES Permit.

1.02 METHOD OF MEASUREMENT AND PAYMENT

- A. The furnishing and installation of specific items and/or the performance of work under TURF ESTABLISHMENT shall be included in the lump sum price bid for the project.

1.03 MODIFICATIONS

- A. Requirements of local governing authority for all work on public property shall supersede these Specifications where in conflict. Make all modifications necessary to comply at no additional cost.

1.04 SPECIFICATION REFERENCE

- A. MnDOT Specification Section 2575 and 3876, shall apply to the establishment of turf, except as modified herein.
- B. MnDOT Technical Memorandum No. 02-23-ENV-05 shall apply to additional seed mixtures.
- C. Unless otherwise noted, the provisions in this Section are in addition to the referenced specification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Seeding Items
 - 1. Seed mixtures to be used are shown on the plans.
 - 2. Seeding with the various seed mixtures shall utilize the following combinations of seed, fertilizer and mulch:

SEED			FERTILIZER		MULCH	
Designation	Name	Application Rate	Type	Application Rate	Type	Application Rate
240	Sandy Roadside	115 lb/AC	12-12-12*	200 lb/AC	1	2500 lb/AC
190	Temporary	180 lb/AC	6-2-24*	200 lb/AC	1	2500 lb/AC
110	Oats	110 lb/AC	6-2-24*	200lb/AC	1	2 Ton/AC

* Phosphorous content shall be at the percentage allowed by the State or local jurisdiction which ever is less.

3. Temporary seeding, when required, shall be Seed Mixture 110B (Oats or Winter Wheat depending on season).

B. Seed Mixtures.

100 (Temporary Fall Seeding)		
Common Name	lb/AC	% of Mix
Winter Wheat	100	100.0
GRAND TOTAL	115	

150 (Temporary Stabilization)		
Common Name	lb/AC	% of Mix
Rye-grass, perennial	15.0	37.5
Wheatgrass, slender	5.0	12.5
Red Clover	10.0	25.0
Alfalfa, vernal	10.0	25.0
GRAND TOTAL	40	100
1 – 2 Year Temporary Stabilization		

240SR (Sandy Roadside)		
Common Name	lb/AC	% of Mix
Brome grass, smooth	15.0	13.0
Bluegrass, Kentucky "Certified Park"	31.0	27.0
Bluegrass, Canada	15.0	13.0
Switch grass	2.9	2.5
Wheatgrass, slender	4.6	4.0
Fescue, Hard "Reliant II"	8.0	7.0
Rye-grass, perennial	23.0	20.0
Dropseed, sand	2.9	2.5
Bluestem, little	4.0 *	3.5
Red Clover	8.0	7.0
Prairie Clover, purple	0.6	0.5
GRAND TOTAL	115	
* Bulk with 50% PLS minimum.		

110 (Temporary Spring/Summer Seeding)		
Common Name	lb/AC	% of Mix
Oats	100	100
GRAND TOTAL	105	

190 (Stabilization)		
Common Name	lb/AC	% of Mix
Red Clover	6.0	10.0
Alsike Clover	4.2.0	7.0
Alfalfa, creeping	9.6	16.0
Brome grass, smooth	7.2	12.0
Rye-grass, perennial	15.0	25.0
Wheatgrass, slender	3.0	5.0
Vetch, hairy	15.0	25.0
GRAND TOTAL	60	100
2 – 5 Year Stabilization		

250GR (General Roadside)		
Common Name	lb/AC	% of Mix
Brome grass, smooth	14.7	14.0
Bluegrass, Kentucky "Certified Park"	30.4	29.0
Bluegrass, Canada	14.7	14.0
Switch grass	3.2	3.0
Wheatgrass, slender	4.2	4.0
Rye-grass, perennial	21.9	21.0
Timothy	3.2	3.0
Redtop	3.2	3.0
Alfalfa, creeping	6.3	6.0
White clover	3.2	3.0
GRAND TOTAL	105	

260 (Commercial Turf)		
Common Name	Lb/AC	% of Mix
Bluegrass, Kentucky "Certified Park"	48	32.0
Bluegrass, Canada	15	10.0
Bluegrass, Kentucky – low maintenance *	45	30.0
Red fescue, creeping	12	8.0
Rye-grass, perennial	20	20.0
Grand Total	150	
* Any accepted low maintenance Kentucky Bluegrass EXCEPT "Park".		

280 (Agricultural Areas)		
Common Name	Lb/AC	% of Mix
Alfalfa, creeping	15.0	30.0
Brome grass, smooth	10.0	20.0
Redtop	3.0	6.0
Rye-grass, perennial	15.0	30.0
Switch grass	2.0	4.0
Timothy	2.0	4.0
Wheat-grass, slender	3.0	6.0
Grand Total	50.0	100.0

310		
Common Name	Lb/AC	% of Mix Component
Bluestem, big	2.5	25.0
Indian grass	2.5	25.0
Wild-eye, Virginia	2.0	20.0
Switch grass	0.5	5.0
Blue-joint grass	0.25	2.5
Green bulrush	0.25	2.5
Wool grass	0.25	2.5
Giant bur reed	0.25	2.5
Cordgrass, prairie	1.5	15.0
Grass Total	10.0	100.0
Winter wheat*	56.0	80.0
Rye-grass, annual	11.2	16.0
Wheatgrass, slender	3.1	4.0
Cover Crop Total	70	100.0
Wet Forbs Mixture	2.0	100.0
Grand Total	82.0	100.0
* Oats to be substituted for spring planting. Native mix for wetter areas. Tall height.		

270 (Residential Turf)		
	Lb/AC	% of Mix
Bluegrass, Kentucky - Elite		
Bluegrass, Kentucky – Improved		
Bluegrass, Kentucky – low maintenance *		
Red fescue, creeping		
Rye-grass, perennial		
Grand Total		
* Any accepted low maintenance Kentucky Bluegrass EXCEPT "Park".		

325		
Common Name	Lb/AC	% of Mix Component
Bluestem, big	1.5	15.0
Fringed, brome	1.5	15.0
Wheatgrass, slender	1.5	15.0
Wild-eye, Virginia	1.5	15.0
Switch grass	0.5	5.0
Fowl bluegrass	1.5	15.0
Indian grass	1.5	15.0
Prairie cord grass	0.5	5.0
Grass Total	10.0	100.0
Blue-joint grass	0.2	10.0
Bottlebrush sedge	0.3	15.0
Tussock sedge	0.2	10.0
Fox sedge	0.2	10.0
Reed manna grass	0.2	10.0
Fowl manna grass	0.2	10.0
Green bulrush	0.2	10.0
Wool grass	0.2	10.0
Soft-stem bulrush	0.3	15.0
Sedge Total	2.0	100.0
Winter Wheat*	56.0	80.0
Rye-grass, annual	11.2	16.0
Wheatgrass, slender	2.8	4.0
Cover Crop Total	70.0	100.0
Wet Forbs Total	2.0	100.0
GRAND TOTALS	92.8.0	100
* Oats to be substituted for spring plantings..		
Native prairie meadow mix for use on hydric soils and wetland restoration.		

328		
Common Name	Lb/AC	% of Mix Component
Bluestem, big	2.0	12.5
Fringed, brome	2.0	12.5
Wild-eye, Virginia	4.0	25.0
Switch grass	1.0	6.5
Fowl bluegrass	5.0	31.0
Indian grass	2.0	12.5
Grass Total	16.0	100.0
Winter Wheat*	56.0	80.0
Rye-grass, annual	11.2	16.0
Wheatgrass, slender	2.8	4.0
Cover Crop Total	70.0	100.0
Milkweed, marsh	0.3	15.0
Prairie clover, purple	0.3	15.0
Tie-trefoil, showy	0.3	15.0
Sunflower, early	0.3	15.0
Black-eyed Susan	0.5	25.0
Vervain, blue	0.3	15.0
Economy Forbs Total	2.0	100.0
GRAND TOTALS	88.0	100
* Oats to be substituted for spring plantings..		
Native mix for infiltration ponds, dry ponds, temporary wet ditches.		

330		
Common Name	Lb/AC	% of Mix
Gamma, sideoats	3.0	21.5
Gamma, blue	2.5	18.0
Bluestem, little	3.5	25.0
June grass	1.0	7.0
Dropseed, sand	1.0	7.0
Wild-rye, Canadian	3.0	21.5
Grass Total	14.0	100.0
Winter Wheat*	56.0	80.0
Rye-grass, annual	11.2	16.0
Wheatgrass, slender	2.8	4.0
Cover Crop Total	70.0	100.0
Dry Forbs	0.5	100.0
GRAND TOTALS	84.5	100.0
* Oats to be substituted for spring plantings		
Short height native mix for sandy/dry areas.		

340		
	Lb/AC	% of Mix
Bluestem, big	3.0	21.5
Bluestem, little	2.5	18.0
Wild-rye, Canadian	2.0	14.0
Gamma, sideoats	2.0	14.0
Switch grass	0.5	4.0
Dropseed, sand	0.5	3.5
Bluegrass, Canada	3.0	21.5
June grass	0.5	3.5
Grass Total	14.0	100.0
Winter Wheat*	56.0	80.0
Rye-grass, annual	11.2	16.0
Wheatgrass, slender	2.8	4.0
Cover Crop Total	70.0	100.0
Dry Forbs	0.5	100.0
GRAND TOTALS	84.5	100.0
* Oats to be substituted for spring plantings		
Mid- height native mix for sandy/dry areas.		

SECTION 02930 - EXTERIOR PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Trees.
2. Shrubs.
3. Ground cover.
4. Plants.

1.2 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: Mineral mulch.
- C. Product certificates.
- D. Planting Schedule: Indicating anticipated planting dates for exterior plants.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer who maintains an experienced full-time supervisor on Project site when exterior planting is in progress.
- B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
- C. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."

- D. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery.
- B. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants trees in shade, protect from weather and mechanical damage, and keep roots moist.

1.6 WARRANTY

- A. Special Warranty: Warrant the following exterior plants, for the warranty period indicated, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, or incidents that are beyond Contractor's control.
1. Warranty Period for Trees and Shrubs: One year from date of Substantial Completion.
 2. Warranty Period for Ground Cover and Plants: Six months from date of Substantial Completion.

1.7 MAINTENANCE

- A. Trees and Shrubs: Maintain during warranty period by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease.
- B. Ground Cover and Plants: Maintain during warranty period by watering, weeding, fertilizing, and other operations as required to establish healthy, viable plantings.

PART 2 - PRODUCTS

2.1 EXTERIOR PLANTS

- A. Tree and Shrub Material: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Ground Cover: Provide ground cover of species indicated, established and well rooted in pots or similar containers, and complying with ANSI Z60.1.

- C. Annuals: Provide healthy, disease-free plants of species and variety shown or listed. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.
- D. Perennials: Provide healthy, field-grown plants from a commercial nursery, of species and variety shown or listed.

2.2 PLANTING MATERIALS

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Reuse surface soil stockpiled on-site and supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Verify suitability of stockpiled surface soil to produce topsoil.
 - 2. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources.
- B. Inorganic Soil Amendments:
 - 1. Lime: ASTM C 602, Class T or O, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.
 - 2. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum 99 percent passing through No. 6 sieve and a maximum 10 percent passing through No. 40 sieve.
 - 3. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
 - 4. Aluminum Sulfate: Commercial grade, unadulterated.
- C. Organic Soil Amendments:
 - 1. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve.
 - 2. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
 - 3. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
 - 4. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
- D. Fertilizer:
 - 1. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - a. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
- E. Mulches:

1. Organic Mulch: Ground or shredded bark.
2. Mineral Mulch: Rounded riverbed gravel or smooth-faced stone.
 - a. Size Range: 1-1/2 inches maximum, 3/4 inch minimum.
 - b. Color: Uniform tan-beige color range.

F. Weed-Control Barriers:

1. Nonwoven Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum.

PART 3 - EXECUTION

3.1 EXTERIOR PLANTING

A. Bed Establishment:

1. Loosen subgrade of planting beds to a minimum depth of 6 inches.
2. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
3. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
4. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
5. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

B. Trees and Shrubs:

1. Pits and Trenches: Excavate circular pits with sides sloped inward. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation. Excavate approximately three times as wide as ball diameter.
2. Set trees and shrubs plumb and in center of pit or trench with top of root ball flush with adjacent finish grades.
 - a. Balled and Burlapped: Remove burlap and wire baskets from tops of root balls and partially from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - b. Balled and Potted: Carefully remove root ball from container without damaging root ball or plant.
 - c. Fabric Bag Grown: Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - d. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

3. Organic Mulching: Apply 3-inch average thickness of organic mulch extending 12 inches beyond edge of planting pit or trench. Do not place mulch within 3 inches of trunks or stems.
- C. Tree and Shrub Pruning: Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.
- D. Ground Cover and Plant Planting:
1. Set out and space ground cover and plants as indicated.
 2. Dig holes large enough to allow spreading of roots, and backfill with planting soil.
 3. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
 4. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
 5. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- E. Planting Bed Mulching:
1. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 6 inches .
 2. Mulch backfilled surfaces of planting beds and other areas indicated. Apply 3-inch average thickness of mulch, and finish level with adjacent finish grades. Do not place mulch against plant stems.
- F. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged exterior planting.
- G. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 02930



Minnesota
Pollution
Control
Agency

National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS)

Application for General Storm-water Permit for Construction Activity (MN R100001)

Minnesota Pollution Control Agency
REM Division, Construction Storm-water Permit Program
520 Lafayette Road North, St. Paul, MN 55155-4194

MPCA use only

ID #

Check #

Please refer to the application instructions and the NPDES/SDS General Storm-water Permit for Construction Activity (MN R100001) as you complete this form. See brackets [] for specific permit references.
Call the MPCA Customer Assistance Center at 651-297-2274 or 800-646-6247 (in Minn.) for assistance.

Permit Application Prerequisites

- Storm-water Pollution Prevention Plan (SWPPP)

- Has a Storm-water Pollution Prevention Plan been developed for this project and incorporated into the project's plans and specifications? [Part III.A]
- Are erosion prevention measures addressed in the SWPPP? [Part IV.B]
- Are sediment control measures addressed in the SWPPP? [Part IV.C]
- Are dewatering and basin draining addressed in the SWPPP? [Part IV.D]
- Are inspections and maintenance addressed in the SWPPP? [Part IV.E]
- Are pollution prevention management measures addressed in the SWPPP? [Part IV.F]
- Is final stabilization addressed in the SWPPP? [Part IV.G]
- If an environmental review was required, did you incorporate all storm-water related mitigation measures contained in the review into the SWPPP?

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ NA ☐ Yes ☐ No

STOP if you responded no to any question above. A SWPPP must be developed prior to submitting a permit application. Complete the above requirements and check yes before submitting this application. Continue if you responded yes or na to all questions above.

- Discharges to Special Waters

Mark NA if no discharges described below will occur.

- Are all storm-water discharges that may flow from the project to a Special Water that is located within 2,000 feet of any project discharge points addressed in the SWPPP to meet the permit conditions in Appendix A, Part A-C?

☐ NA ☐ Yes ☐ No

STOP if you responded no. Complete the above requirements and check yes before submitting this application. Continue if you responded yes.

- Additional Application Review

- Will the project include alternative treatment methods? [Part III.C.5]
If yes, this application and the alternative treatment plans must be submitted a minimum of 90 days before construction starts.
- If yes, are the plans attached?
- a. Will the project disturb 50 acres? AND Is there a discharge point within 2000 feet of an impaired or special water whose discharge may reach an impaired or special water listed in Appendix A of the permit? [Part II.B.1.b]
If yes, this application and the SWPPP must be submitted a minimum of 30 days before construction starts.
- b. If yes, is the SWPPP attached?

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

2. Application Fee

Is the required \$400 Application Fee enclosed?

☐ Yes

Construction Activity Information

3. Project Name: _____

4. Project Location: _____

Briefly describe where construction activity occurs - Example: Intersection of 45th Street and Irving Avenue. Include address if available

MN

City or Township

State

Zip Code

County Parcel ID # Attach list if necessary

All cities where construction will occur

All counties where construction will occur

All townships where construction will occur

5. Project Size

Number of acres to be disturbed _____

6. Project Map Is the required 8 1/2 x 11" United States Geological Survey (USGS) 7.5 minute quad or ☐ Yes
equivalent map indicating site boundaries attached?7. Project Type ☐ Residential ☐ Commercial/Industrial ☐ Road Construction
☐ Other _____8. Cumulative
Impervious
Surfacea. Existing area of impervious surface 0 (to the nearest quarter acre)b. Post construction area of impervious surface _____ (to the nearest quarter acre)
If new impervious surface created by the project is less than one acre, skip to question 12.9. Permanent
Storm-water
ManagementWhat types (check all that apply) of permanent storm-water management will be used if more than one
acre of new impervious surface is created by the project? [Part III. C]☐ Wet Sedimentation Basin ☐ Infiltration/Filtration ☐ Regional Ponding
☐ Alternative Methods (If using alternative methods, construction cannot commence until receiving approval from the MPCA.)☐ Other _____

Specify reason and list other treatment allowed by Part III. C

10. Receiving
WatersIdentify surface waters within 1/2 mile of project boundary that will receive storm water from the site or
discharge from permanent storm-water management system. Include waters shown on USGS 7.5 minute
quad or equivalent and all waters identified in Appendix A of the permit. Add additional paper if needed.

Name of Water Body	Type (ditch, pond, wetland, lake, stream, river)	Appendix A special water?
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No

• Dates of Construction

a. Construction Start Date

b. Estimated Completion Date

11. Owner

Business or Firm Name			Federal Tax ID	State Tax ID
Last Name	First Name	Title	E-mail	Telephone (include area code)
Mailing Address			City	State Zip Code
Alternate Contact Last Name First Name		E-mail		Telephone (include area code)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or the persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also certify under penalty of law that I have read, understood, and accepted all terms and conditions of the NPDES/SDS General Storm-water Permit Construction Activity (MNR100001) that authorizes storm-water discharges associated with the construction site identified on this form.

Authorized Signature

Date

This Application must be signed by:

- *Corporation: a principal executive officer of at least the level of vice-president or the duly authorized representative or agent of the executive officer if the representative or agent is responsible for the overall operation of the facility that is the subject of the permit application.*
- *Partnership or Sole Proprietorship: a general partner or the proprietor.*
- *Municipality, State, Federal or Other Public Agency: principal executive officer or ranking elected official.*

12. Contractor

Business or Firm Name			Federal Tax ID	State Tax ID
Last Name	First Name	Title	E-mail	Telephone (include area code)
Mailing Address			City	State Zip Code
Alternate Contact Last Name First Name		E-mail		Telephone (include area code)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or the persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I also certify under penalty of law that I have read, understood, and accepted all terms and conditions of the NPDES/SDS General Storm-water Permit for Construction Activity (MNR100001) that authorizes storm-water discharges associated with the construction site identified on this form.

Authorized Signature

Date

This Application must be signed by:

- *Corporation: a principal executive officer of at least the level of vice-president or the duly authorized representative or agent of the executive officer if the representative or agent is responsible for the overall operation of the facility that is the subject of the permit application.*
- *Partnership or Sole Proprietorship: a general partner or the proprietor.*
- *Municipality, State, Federal or Other Public Agency: principal executive officer or ranking elected official.*

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Minnesota Pollution Control Agency

Protecting Minnesota's Environment and Quality of Life

APPLICATION INSTRUCTIONS for MINNESOTA'S NPDES/SDS GENERAL STORM-WATER PERMIT for CONSTRUCTION ACTIVITY

Submission of an application is notice that the owner and general contractor identified on the application intend to be authorized by an NPDES/SDS permit issued for storm-water discharges associated with a construction activity in the State of Minnesota.

Permit Application Prerequisites

For Questions 1-3, please refer to the NPDES/SDS General Storm-water Permit for Construction Activity and the flowchart at the end of these instructions.

1. Indicate if a Storm-water Pollution Prevention Plan (SWPPP) has been prepared and the appropriate sections (a through h of this question) have been addressed by answering "Yes" or "No". A SWPPP is a plan for storm-water discharge that includes erosion prevention measures and sediment controls that, when implemented, will decrease soil erosion on a parcel of land and decrease pollution in receiving waters. This plan must be developed prior to submitting a permit application. A sample plan and development tools are available on the U.S. Environmental Protection Agency web page at <http://cfpub1.epa.gov/npdes/stormwater/swppp.cfm>

For section "h" indicate if an Environmental Review has been completed if required, by answering "Yes" or "No" or "NA". Environmental review looks at how a proposed project could potentially affect the environment and looks at ways to avoid or minimize impacts before the project is permitted and built. Examples of categories that may need an environmental review include residential development; industrial, commercial, and institutional facilities; and also highway projects. For certain projects, environmental review is mandatory. For more details see the *Guide to Minnesota Environmental Review Rules*, Chapter 6. This can be found at <http://www.mnplan.state.mn.us/pdf/rulguid3.pdf>

2. Indicate if discharges to special waters have been identified and addressed by answering "Yes" or "No" or "NA" (not applicable) on the Permit Application. The questions at the right can help in making this determination.

Special waters have qualities that warrant extra protection. A list of these special water categories can be found in Appendix A of the permit. For information on special waters near the project's area, see the Minnesota Pollution Control Agency (MPCA) Web page at <http://www.pca.state.mn.us/publications/wq-strm1-05.xls>

Special Waters

- 2.a. Do you have a special water that is within 2,000 feet of the project?
(see Appendix A of the Permit for a list of these Special water categories)
- 2.b. Do you have storm-water discharges that are within 2,000 feet of these special waters?
- 2.c. Will the discharges identified in 2.b. flow to the special waters?

3. Indicate by answering "Yes" or "No" whether the project will include alternative methods for the permanent storm-water management system or will disturb 50 acres or more and have a discharge point (including sheet flow) that is within 2000 feet of and flows to an impaired or special water. Additional review from the MPCA is required in these cases.

You have the option of proposing an alternative, innovative, permanent storm-water management system. You must send in the permit application and the additional required information (see Part III.C.5 of the Permit) at least 90 days prior to the start of construction if you choose this approach. You must receive an approval letter from the MPCA for this method before beginning construction.

The application and SWPPP need to be submitted to the MPCA a minimum of 30 days prior to the start of construction if the project disturbs 50 acres or more and drains to an impaired water or a special water listed in Appendix A of the permit. For a list and maps of impaired waters in MN go to www.pca.state.mn.us/water/tmdl.html

4. The application requires a \$400 application fee. Indicate that the application fee has been enclosed by answering "Yes". Please make checks payable to: Minnesota Pollution Control Agency and submit the check with the completed application to: MPCA, Regional Environmental Management Division, 520 Lafayette Road North, St. Paul, MN 55155-4194. Applications received without the required fee will be returned to the sender.

Construction Activity Information

5. List the construction project's name. If the project does not have a name, list the type of project and a brief description (for example, "I-35E/I-494 Interchange" or "Highway 169 bridge replacement (#79605) at the Rum River").
6. Provide an address (if available) and brief description of the construction activity's location (for example, "North West Corner of the Intersection of 45th Street and Irving Avenue, Minneapolis, MN").

List the County Parcel ID# for the project if it is known. If there are multiple numbers within the project, attach a list. Parcel Identification Numbers are unique numbers assigned by the County. Listing the County Parcel ID# is not required if not available (for example, highway projects)

Provide the names of all cities, counties, and townships the construction activity takes place in (for example, a roadway may cross county, city, or township boundaries).

7. List, in acres, the amount of area to be disturbed for this project.
8. Attach the required map and indicate that it is included with the permit application. United States Geological Survey (USGS) 7.5-minute quad maps or equivalent maps may be used.
USGS 7.5-minute quad maps may be ordered at
http://edc.usgs.gov/Webglis/glisbin/finder_main.pl?dataset_name=MAPS_LARGE
9. Indicate the type of construction activity by checking the appropriate box. Please describe the project if you check "Other".
10. Indicate to the nearest quarter acre, the existing and resulting areas of impervious surfaces. Impervious surface means a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads. (a.) "Existing" area means the area of impervious surface that is present prior to the start of this construction project. (b.) "Post construction" means the entire area of impervious surface after construction is completed. Subtract (a.) from (b.) to determine the area of new impervious surface.
11. For projects creating one or more acres of cumulative new impervious surfaces, check the appropriate box to indicate which type(s) of permanent storm-water management practices that will be used. The "Other" box is limited to those situations (such as proximity to bedrock) that are described in Part III.C of the permit. See the permit for a further description. If the "Other" box is checked, describe which situation outlined in Part III. C. fits the project and what other permanent treatment (such as grassed swales, smaller ponds and/or grit chambers) will be used on the project.

12. BRIEFLY describe which waterbody(s) will receive storm-water runoff from the construction site or from the discharge from permanent storm-water management systems by completing the table. To determine which waterbody(s) will receive storm-water runoff discharges, make a brief survey of the project's surrounding area. Include the waters identified on a USGS 7.5-minute quad or equivalent map. See Appendix A of this permit to determine if a waterbody is a special water.
13. List the start and estimated completion dates of the construction project (for example, 9/18/03).

Responsible Parties

14. **Owner Information:** Provide the information requested of the owner of the company, organization, or other entity for which this construction project is being done. The Owner means the person or party possessing the title of the land on which the construction activities will occur; or if the construction activity is for a lease holder, the party or individual identified as the lease holder; or the contracting government agency responsible for the construction activity. The owner is the party responsible for the compliance with all terms and conditions of the permit. The alternate contact should be the owner's representative in charge of the project (for example, Sandy Smith, Inspector; Joe Johnson, Project Manager; etc).

After completing this application, certify it with a signature and date from an individual authorized to sign the application. This application form must be signed by either a principal executive officer, vice president, representative agent responsible for overall operations, general partner, or a proprietor. If the activity is being conducted by a unit of government (state, county, municipality, or township), this application must be signed by a principal executive officer or ranking elected official (for example, city or county engineer, administrator, or manager; director of public works; mayor, etc.) For additional information, see Minnesota Rules 7001.0060.

15. **Contractor (Operator) Information:** Provide the information requested of the contractor. The Contractor means the party who signs the construction contract with the owner to construct the project described in the final plans and specifications. Where the construction project involves more than one contractor, the general contractor will be the party responsible for managing the project on behalf of the owner. In some cases the owner may be the general contractor. In these cases, the owner may contract an individual as the operator who would be the co-permittee. The operator (usually the general contractor) is jointly responsible with the owner for compliance with part II.B., part II.C., and part IV of the permit.

After this application has been completed by the owner, the contractor must certify it with a signature and date from an individual authorized to sign the form. The application must be signed by either a principal executive officer, vice president, representative agent responsible for overall operations, general partner, or a proprietor. If the general contractor is a unit of government (state, county, municipality, or township), this application must be signed by a principal executive officer, ranking elected official, administrator, manager, coordinator, or engineer. (For additional information, see Minnesota Rules 7001.0060.) The alternate contact should be the contractor's representative in charge of the project (for example, Scott Marshall, Head Foreman; Ann Johnson, Project Manager, etc.).

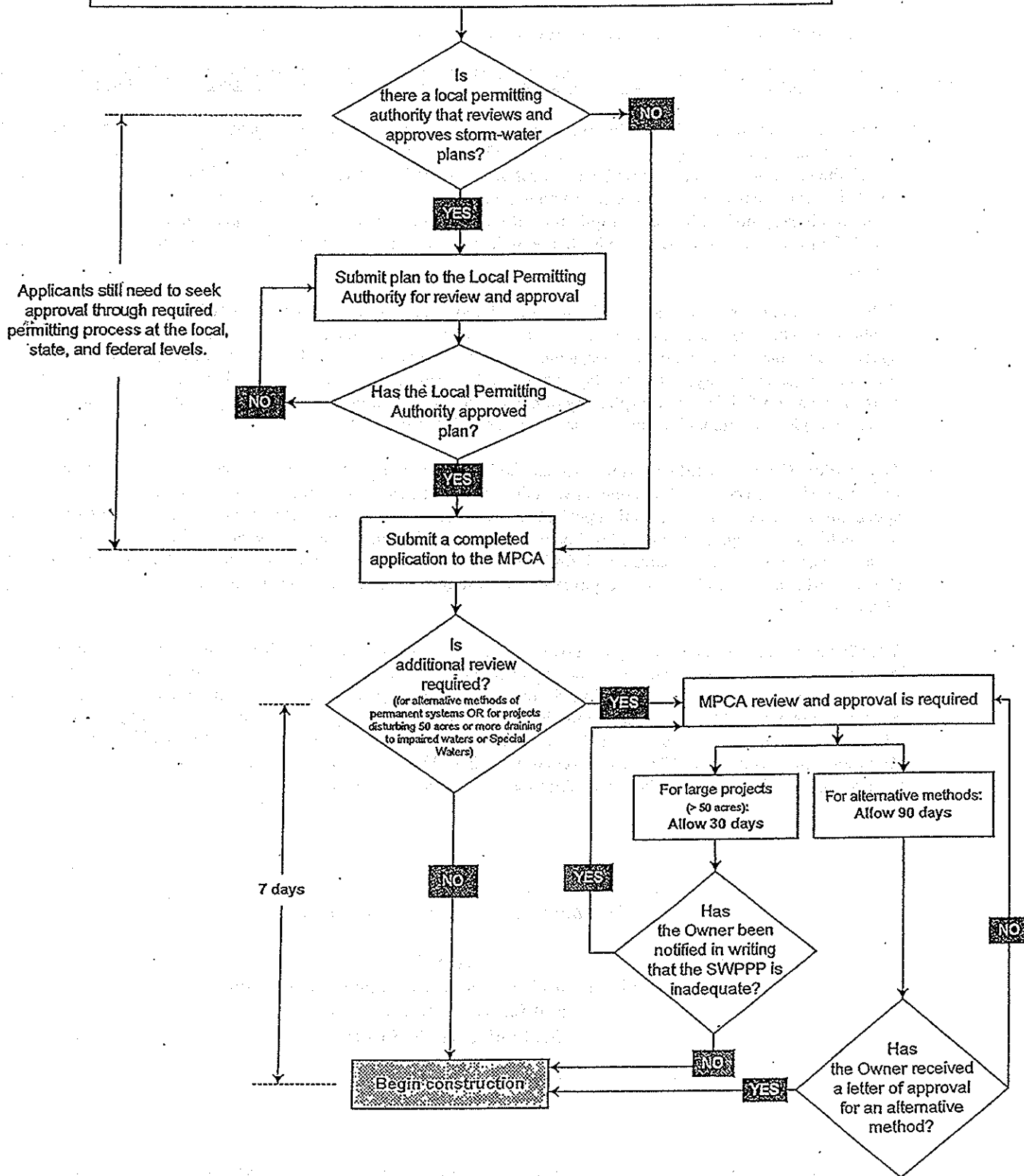
Send the completed application and fee to:

MPCA
Regional Environmental Management Division
520 Lafayette Road North
St. Paul, MN 55155-4194

*Questions? Contact the MPCA Customer Assistance Center at (800) 646-6247 or (651) 297-2274.
For businesses with fewer than 100 employees, contact the MPCA Small Business Assistance Program at (800) 657-3938.*

Owner develops a Storm-water Pollution Prevention Plan (SWPPP) and incorporates it into the projects final plans and specifications.

Includes identifying all discharges to Special Waters.
Includes determining if Environmental Review has been completed if needed.



GENERAL PERMIT
AUTHORIZATION TO DISCHARGE
STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY
UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION
SYSTEM/STATE DISPOSAL SYSTEM PERMIT PROGRAM

ISSUANCE DATE: August 1, 2003 EXPIRATION DATE: August 1, 2008

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.; hereinafter, the "Act"), 40 CFR 122, 123, and 124, as amended, et seq.; Minn. Stat. Chs. 115 and 116, as amended, and Minn. R. Ch. 7001:

This permit regulates the discharges of storm water to the waters of the state of Minnesota associated with construction activity. This permit covers the storm water discharges identified in Part I.A. of this permit. The limitations on permit coverage are identified in Part I.B. of this permit.

This permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). No person shall commence construction activity covered by Part I.A. until permit coverage under this permit is effective or, if applicable, until the Minnesota Pollution Control Agency (MPCA) has issued an individual NPDES/SDS construction storm water permit for the project. The SWPPP must be completed prior to submitting any permit application and prior to conducting any construction activity by any required Permittee.

Unless notified by the MPCA to the contrary, applicants who submit a completed application (including permit fee) in accordance with the requirements of this permit are authorized to discharge storm water from construction sites under the terms and conditions of this permit 7, 30, or 90 days after the postmarked date of the completed application as described in Part II.B.

Coverage under this permit will remain in effect until the owner has submitted a Notice of Termination, regardless of the above expiration date.

Signature: _____

for

Minnesota Pollution Control Agency

If you have questions on this permit, including the specific permit requirements, permit reporting or permit compliance status, please contact the appropriate MPCA offices.

Minnesota Pollution Control Agency
Construction Storm Water Program
520 Lafayette Road North
St. Paul, MN 55155-4194
Telephone (651) 297-2274

wq-stm2-51

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PART I. PERMIT COVERAGE AND LIMITATIONS

A. PERMIT COVERAGE

1. This permit is required for storm water discharges associated with construction activity and with small construction activity as defined in 40 C.F.R. part 122.26(b)(14)(x) and (b)(15), respectively.
2. This permit authorizes, subject to the terms and conditions of this permit, the discharge of storm water associated with construction activity and small construction activity.

Construction activity includes clearing, grading and excavation, that disturbs land of equal to or greater than five (5) acres and includes the disturbance of less than five (5) acres of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb five (5) acres or more.

Small construction activity includes clearing, grading and excavation, that disturbs land of equal to or greater than one (1) acre, and includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one and less than five (5) acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility.

3. This permit covers all areas of the state of Minnesota.
4. For Parts I.B through Appendix A of this permit, all reference to construction activity includes both small construction activity and construction activity.

B. LIMITATIONS OF COVERAGE

This permit does not cover the following activities:

1. Discharges or releases that are not storm water except those non-storm water discharges authorized under Part IV.D.
2. The placement of fill into waters of the state requiring local, state, or federal authorizations (such as U.S. Army Corps of Engineers Section 404 permits, Department of Natural Resources Public Waters Work Permits or Local Governmental Unit Wetland Conservation Act replacement plans or determinations).
3. Storm water discharges associated with industrial activity that originate from the site after construction activities have been completed and the site has undergone final stabilization. Post-construction industrial storm water discharges may need to be covered by a separate NPDES/SDS permit.
4. Non-point source agricultural and silvicultural discharges excluded from NPDES permit requirements under 40 CFR part 122.3(e).
5. Discharges to the waters identified below unless the requirements of Appendix A. are complied with:

- a. Discharges into outstanding resource value waters (ORVWs) as defined in Minn. R. 7050.0180, subp. 3 and 6, except calcareous fens listed in Minn. R. 7050.0180, subp. 6.b.
 - b. Discharges into Trout waters as listed in Minn. R. 6264.0050, subp. 2 and 4.
 - c. Discharges into Wetlands as listed in Minn. R. 7050.0130, item. F.
 - d. Discharges from projects that have not met applicable Environmental Review requirements under state or federal laws.
 - e. Discharges that adversely impact or contribute to adverse impacts on a listed endangered or threatened species or adversely modify a designated critical habitat.
 - f. Discharges which adversely affect properties listed or eligible for listing in the National Register of Historic Places or affecting known or discovered archeological sites.
6. Discharges to calcareous fens listed in Minn. R. 7050.0180, subp. 6.b.
 7. Discharges to waters for which there is a total maximum daily load (TMDL) allocation for sediment and parameters associated with sediment transport are not eligible for coverage under this permit unless the Permittee(s) develop and certify a SWPPP that is consistent with the assumptions, allocations and requirements in the approved TMDL. To be eligible for coverage under this general permit, Permittee(s) must incorporate into their SWPPP any conditions applicable to their discharges necessary for consistency with the assumptions, allocations and requirements of the TMDL within any timeframes established in the TMDL. The SWPPP must include the provisions in Part III.A.7. If a specific numeric wasteload allocation has been established that would apply to the project's discharges, the Permittee(s) must incorporate that allocation into its SWPPP and implement necessary steps to meet that allocation.

PART II. SUBMITTING THE APPLICATION

A. PREREQUISITE FOR SUBMITTING A PERMIT APPLICATION

The owner must develop a Storm Water Pollution Prevention Plan (SWPPP) in accordance with Part III (Storm Water Discharge Design Requirements) of this permit. The plans are not to be submitted to the MPCA (unless the project size is 50 acres or more and will discharge to certain waters as described in Part II.B.1.b.) but are to be retained by the owner in accordance with Part III.D (Record Retention). The applicants' failure to complete the SWPPP prior to submitting the application will result in the application being returned and the storm water discharges associated with construction activity will not be authorized by this permit.

B. APPLICATION AND DURATION OF COVERAGE

1. Application Required.

- a. The owner and operator shall submit a completed application form (or a photocopy thereof) with the appropriate fee for project size (see application form) to the MPCA for each project which disturbs one (1) or more acres of land. The owner and operator of a common plan

of development or sale that will ultimately disturb one (1) or more acres must submit a completed application to the MPCA.

- b. For certain projects or common plans of development or sale disturbing 50 acres or more, the application must be submitted at least 30 days before the start of construction activity. This requirement pertains to projects that have a discharge point on the project that is within 2000 feet of, and flows to, a special water listed in Appendix A, Part B. or waters listed as impaired under section 303(d) of the federal Clean Water Act (see MPCA's web site). Applicants must submit a completed application form and Storm Water Pollution Prevention Plan including all calculations for the Permanent Storm Water Management System (see Part III.A - C).
2. The Owner and Operator are Permittee(s). The owner who signs the application is a Permittee and is responsible for compliance with all terms and conditions of this permit. The operator (usually the general contractor) who signs the application is a Permittee for Parts II.B., Part II.C. and Part IV. of this permit and is jointly responsible with the owner for compliance with those portions of the permit.
3. Permit Coverage. The commencement of any construction activity (e.g., land disturbing activities) covered under Part I.A. of this permit is prohibited until permit coverage under this permit is effective or, if applicable, until the MPCA has issued an individual NPDES/SDS construction storm water permit for the project.
 - a. Except as provided in subp. 3.b. and 3.c. below, permit coverage will become effective seven (7) days after the postmarked date of the completed application form.
 - b. For projects disturbing 50 acres or more, that have a discharge point on the project that is within 2000 feet of, and flows to, a special water listed in Appendix A, Part B. or waters listed as impaired under section 303(d) of the federal Clean Water Act, the applicants must submit a completed application and SWPPP to the MPCA at least thirty (30) days prior to the commencement of construction activities. MPCA staff will review the SWPPP submitted with the completed application and unless the Permittee is notified in writing that the SWPPP does not meet the general permit requirements, permit coverage will become effective 30 days after the postmarked date or MPCA date-stamp (whichever is first) of the completed application.
 - c. For proposals to use Alternative Method(s) for the Permanent Storm Water Management System under Part III.C.5, the applicants must submit a completed application and SWPPP, including the Alternative Method documentation under Part III.C.5, to MPCA for review and approval at least 90 days prior to the proposed starting date of construction activity.
 - i. The MPCA will notify the applicant within the 90-day period, in writing, whether the alternative method is approved or not approved and, if applicable, the basis for denial.
 - ii. The applicant may re-submit the alternative method after addressing the MPCA's basis for denial. The MPCA will respond within 30 days.
 - iii. Permit coverage will become effective upon receipt of an alternative treatment method approval letter from MPCA. Any construction activity on the project is not covered under this permit until receiving the alternative treatment approval letter.

4. Coverage Letter. For projects under subpart 3.a. of this part, the Permittee(s) will receive a permit letter and certificate acknowledging permit coverage, usually within 30 days of the postmarked date of the completed application.
5. Change of Coverage. For storm water discharges from construction projects where the owner or operator changes, (e.g., an original developer sells portions of the property to various homebuilders) the new owner or operator must submit a subdivision registration within 7 days of assuming operational control of the site, commencing work on their portion of the site, or of the legal transfer, sale or closing on the property. For instances where an owner or operator of an entire project changes after an application has been submitted under Part II, the new owner or operator must submit an application for permit transfer/modification within 7 days of assuming control of the site or commencing work on-site, or of the legal transfer, sale or closing on the property. Late submittals will not be rejected; however, the MPCA reserves the right to take enforcement for any unpermitted discharges or permit noncompliance for the new registered party that has assumed control of the site. For storm water discharges from construction activities where the owner or operator changes, the new owner or operator can implement the original SWPPP created for the project or develop and implement their own SWPPP. Permittee(s) shall ensure either directly or through coordination with other Permittee(s) that their SWPPP meets all terms and conditions of this permit and that their activities do not render another party's erosion prevention and sediment control Best Management Practices (BMPs)."

C. TERMINATION OF COVERAGE

1. Permittee(s) wishing to terminate coverage under this permit must submit a Notice of Termination (NOT) to the MPCA. Compliance with this permit is required until a NOT is submitted. The Permittee(s) authorization to discharge under this permit terminates at midnight of the day the NOT is signed.
2. All Permittee(s) must submit a NOT within thirty (30) days after one or more of the following conditions have been met:
 - a. Final stabilization (see Part IV.G. and definition in Appendix B) has been achieved on all portions of the site for which the Permittee is responsible (including the removal of all temporary measures such as silt fence, and if applicable, returning agricultural land to its pre-construction agricultural use);
 - b. Another owner/operator (Permittee) has assumed control according to Part II.B.5 over all areas of the site that have not been finally stabilized; or
 - c. For residential construction only, temporary erosion protection and down gradient perimeter control for individual lots has been completed and the residence has been transferred to the homeowner. Additionally, the Permittee must distribute the MPCA's "homeowner factsheet" to the homeowner to inform the homeowner of the need for, and benefits of, final stabilization.
3. Permittee(s) that use an alternative method for the permanent storm water management system as described in Part III.C.5, are prohibited from terminating this permit until final stabilization has been achieved on site and either:

- a. The two years of monitoring data has been submitted to the MPCA and the MPCA has determined that the required treatment has been achieved. The Permittee will be notified in writing within 30 days after the monitoring data has been submitted. If the Permittee has not heard from the MPCA within 30 days after submitting the required data, the Permittee can submit a Notice of Termination.
- b. The Permittee can submit a Notice of Termination, even if the timeframe is less than two years, if the MPCA determines that the alternative method is achieving the required treatment.

During the monitoring and evaluation of the alternative method, the Permittee is not responsible for other permit requirements that have been transferred as described in Part II.B.5.

PART III. STORM WATER DISCHARGE DESIGN REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN

The owner must develop a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall be completed prior to submitting any permit application and prior to conducting any construction activity by any required Permittee(s). The plan must be a combination of narrative, plan sheets and if appropriate standard detail sheets that address the foreseeable conditions, at any stage in the construction or post construction activities. The plan must include a description of the nature of the construction activity. The plan must address the potential for discharge of sediment and/or other potential pollutants from the site. For storm water discharges from construction activities where the owner or operator changes, the new owner or operator can implement the original SWPPP created for the project or develop and implement their own SWPPP. Permittee(s) shall ensure either directly or through coordination with other Permittee(s) that their SWPPP meets all terms and conditions of this permit and that their activities do not render another party's erosion prevention and sediment control Best Management Practices (BMPs) ineffective.

1. As part of the SWPPP the owner must identify a person knowledgeable and experienced in the application of erosion prevention and sediment control BMPs who will oversee the implementation of the SWPPP, and the installation, inspection and maintenance of the erosion prevention and sediment control BMPs before and during construction. The owner must identify who will have the responsibility for long term operation and maintenance of the permanent storm water management system (see Part III.C.). The owner shall develop a chain of responsibility with all operators on the site to ensure that the SWPPP will be implemented and stay in effect until the construction project is complete, the entire site has undergone final stabilization, and a NOT has been submitted to the MPCA.
2. The SWPPP must incorporate the requirements of Part III (Storm Water Discharge Design Requirements), Part IV (Construction Activity Requirements) and Appendix A for the project. A narrative describing the timing for installation of all erosion prevention and sediment control BMPs required in Part III, Part IV and Appendix A must also be included in the plan.
3. The SWPPP requirements must be incorporated into the project's final plans and specifications and/or project documentation, as appropriate, and must include:
 - a. Location and type of all temporary and permanent erosion prevention and sediment control BMPs along with procedures to be used to establish additional temporary BMPs as

necessary for the site conditions during construction. Standard plates and/or specifications for the BMPs used on the project must be included in the final plans and specifications for the project.

- b. A site map with existing and final grades, including dividing lines and direction of flow for all pre and post-construction storm water runoff drainage areas located within the project limits. The site map must also include impervious surfaces and soil types.
 - c. Locations of areas not to be disturbed.
 - d. Location of areas where construction will be phased to minimize duration of exposed soil areas.
 - e. All surface waters and existing wetlands, which can be identified on maps such as United States Geological Survey 7.5 minute quadrangle maps or equivalent maps within one-half mile from the project boundaries, which will receive storm water runoff from the construction site, during or after construction. Where surface waters receiving runoff associated with construction activity will not fit on the plan sheet, they must be identified with an arrow, indicating both direction and distance to the surface water.
 - f. Methods to be used for final stabilization of all exposed soil areas.
4. The Permittee(s) must amend the SWPPP as necessary to include additional requirements, such as additional or modified BMPs, designed to correct problems identified or address situations whenever:
- a. There is a change in design, construction, operation, maintenance, weather or seasonal conditions that has a significant effect on the discharge of pollutants to surface waters or underground waters;
 - b. Inspections or investigations by site operators, local, state or federal officials indicate the SWPPP is not effective in eliminating or significantly minimizing the discharge of pollutants to surface waters or underground waters or that the discharges are causing water quality standard exceedances; or
 - c. The SWPPP is not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity, or the SWPPP is not consistent with the terms and conditions of this permit.
 - d. At any time after permit coverage is effective, the MPCA may determine that the project's storm water discharges may cause, have reasonable potential to cause, or contribute to non-attainment of any applicable water quality standard, or that the SWPPP does not incorporate the requirements in Part III.A.7 related to an approved Total Maximum Daily Load (TMDL) implementation plan that contains construction storm water related requirements. If MPCA makes such determination(s) or any of the determinations in Parts III.A.4.a.-4.c., MPCA will notify the Permittees in writing. In response, the Permittees must develop a supplemental BMP action plan or appropriate SWPPP amendments describing SWPPP modifications to address the identified concerns and submit information requested by MPCA, which may include

an individual permit application. If MPCA's written notification requires a response, failure to respond within the specified timeframe constitutes a permit violation.

5. The SWPPP must factor in any findings of and include any storm water mitigation measures required as the result of any environmental, archeological or other required local, state or federal review conducted for the project. For the purposes of this permit provision, mitigation measures mean avoiding, minimizing, rectifying (e.g., repairing, rehabilitating, restoring), reducing, eliminating or compensating for impacts related to: (1) storm water discharges associated with the project's construction activity; and (2) erosion prevention, sediment control and the permanent storm water management system for the project.
6. The SWPPP must provide additional measures as necessary to assure compliance with surface and ground water standards in Minn. R. chapters 7050 and 7060 in karst areas and to ensure protection of drinking water supply management areas (see Minn. R. 4725.4450).
7. If runoff from the site discharges to an impaired water which has an approved TMDL implementation plan containing requirements for construction storm water discharges, the Permittee must include the following in the SWPPP:
 - a. identify the receiving water and the areas of the site discharging to it; and
 - b. BMPs that are appropriate for the site and sufficient to comply with all applicable requirements of the TMDL implementation plan.

B. TEMPORARY SEDIMENT BASINS

Where ten (10) or more acres of disturbed soil drain to a common location, a temporary (or permanent) sediment basin must be provided prior to the runoff leaving the construction site or entering surface waters. The Permittee is encouraged, but not required, to install temporary sediment basins where appropriate in areas with steep slopes or highly erodible soils even if less than ten (10) acres drains to one area. The basins must be designed and constructed according to the following requirements:

1. The basins must provide storage below the outlet pipe for a calculated volume of runoff from a 2 year, 24 hour storm from each acre drained to the basin, except that in no case shall the basin provide less than 1800 cubic feet of storage below the outlet pipe from each acre drained to the basin.
2. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage below the outlet pipe per acre drained to the basin, shall be provided where attainable until final stabilization of the site.
3. Temporary basin outlets must be designed to prevent short-circuiting and the discharge of floating debris. The basin must be designed with the ability to allow complete basin drawdown (e.g., perforated riser pipe wrapped with filter fabric and covered with crushed gravel, pumps or other means, see Part IV.D.) for maintenance activities, and provide a stabilized emergency overflow to prevent failure of pond integrity. Energy dissipation must be provided for the basin outlet (see Part IV.B.4).

4. The temporary (or permanent) basins must be constructed and made operational concurrent with the start of soil disturbance that is upgradient of the area and contributes runoff to the pond.
5. Where the temporary sediment basin is not attainable due to site limitations, equivalent sediment controls such as smaller sediment basins, and/or sediment traps, silt fences, vegetative buffer strips, or any appropriate combination of measures are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. In determining whether installing a sediment basin is attainable, the Permittee must consider public safety and may consider factors such as site soils, slope, and available area on site. This determination must be documented in the SWPPP.

C. PERMANENT STORM WATER MANAGEMENT SYSTEM

All storm water must be discharged in a manner that does not cause nuisance conditions, erosion in receiving channels or on downslope properties, or inundation in wetlands causing a significant adverse impact to the wetlands.

Where a project's ultimate development replaces vegetation and/or other pervious surfaces with one or more acres of cumulative impervious surface, a water quality volume of $\frac{1}{2}$ inch of runoff from the new impervious surfaces created by the project must be treated by one of the methods outlined in Part III.C.1 through Part III.C.5 prior to the runoff leaving the construction site or entering surface waters (excluding drainage systems that convey storm water to a constructed permanent storm water management facility designed to treat the water quality volume from the project).

For those areas of a project where there is no feasible way to meet the treatment requirement for the water quality volume, other treatment such as grassed swales, smaller ponds or grit chambers is required prior to discharge to surface waters. A cumulative maximum of (3) three acres or 1% of project size whichever is larger can be treated in this manner.

Where the proximity to bedrock precludes the installation of any of the permanent storm water management practices outlined in Part III.C., other treatment, such as grassed swales, smaller ponds, or grit chambers, is required prior to discharge to surface waters.

For work on road projects where the lack of right of way precludes the installation of any of the permanent storm water management practices outlined in Part III.C., other treatment such as grassed swales, smaller ponds, or grit chambers, is required prior to discharge to surface waters.

1. Wet Sedimentation Basin

- a. The basin must have a permanent volume of 1800 cubic feet of storage below the outlet pipe for each acre that drains to the basin. The basin's permanent volume must reach a minimum depth of at least 3 feet and must have no depth greater than 10 feet. The basin must be configured such that scour or resuspension of solids is minimized.
- b. The basin's water quality volume is calculated as $\frac{1}{2}$ inch of runoff from the new impervious surfaces created by the project.
- c. Basin outlets shall be designed such that the water quality volume is discharged at no more than 5.66 cubic feet per second (cfs) per acre of surface area of the pond.

- d. Basin outlets must be designed to prevent short-circuiting and the discharge of floating debris. Basin outlets must have energy dissipation.
- e. The basin must provide a stabilized emergency overflow to accommodate storm events in excess of the basin's hydraulic design.
- f. Adequate maintenance access must be provided (typically 8 ft. wide) for future maintenance of the basin.

2. Infiltration/Filtration

Infiltration/Filtration options include but are not limited to: infiltration basins, infiltration trenches, rainwater gardens, sand filters, organic filters, bioretention areas, enhanced swales, dry storage ponds with underdrain discharge, off-line retention areas and natural depressions. Infiltration must be used only as appropriate to the site and land uses. Settleable solids, floating materials, oils and grease should be removed from the runoff to the maximum extent practicable before runoff enters the infiltration/filtration system. Filtration systems must have a reasonable chance of achieving approximately 80% removal of total suspended solids. The Permittee(s) must evaluate the impact of constructing an infiltration practice on existing hydrologic features (e.g., existing wetlands) and try to maintain pre-existing conditions (e.g., do not breach a perched water table which is supporting a wetland). For a discussion of ground water warnings, design measures, maintenance considerations or other retention, detention, and treatment devices, see the MPCA's *Protecting Water Quality in Urban Areas* found on the MPCA's web-site.

- a. Infiltration systems should not be excavated to final grade until the contributing drainage area has been constructed and fully stabilized.
- b. During construction of an infiltration system, rigorous sediment and erosion controls (e.g., diversion berms) should be used to keep sediment and runoff completely away from the infiltration area. The area must be staked off and marked so that heavy construction equipment will not compact the soil in the proposed infiltration area.
- c. To prevent clogging of the infiltration or filtration system, a pretreatment device such as a vegetated filter strip, small sedimentation basin, or water quality inlet (e.g., grit chamber) must be used to settle particulates before the storm water discharges into the infiltration or filtration system.
- d. Infiltration or filtration systems shall be sufficient to infiltrate or filter a water quality volume of $\frac{1}{2}$ inch of runoff from the new impervious surfaces created by the project.
- e. The water quality volume shall discharge through the soil or filter media in 48 hours or less. Additional flows that cannot be infiltrated or filtered in 48 hours should be routed to bypass the system through a stabilized discharge point. A way to visually verify that the system is operating as designed must be provided.
- f. Appropriate on-site testing shall be conducted to ensure a minimum of 3 feet of separation from the seasonally saturated soils (or from bedrock) and the bottom of the proposed infiltration system. Calculations and computer model results that demonstrate the design adequacy of the infiltration system must be included as part of the SWPPP.

- g. Adequate maintenance access must be provided (typically 8 ft. wide) along with a maintenance plan identifying whom will be performing future maintenance of the infiltration or filtration system.
- h. Use of designed infiltration systems from industrial areas with exposed significant materials or from vehicle fueling and maintenance areas is prohibited.

3. Regional Ponds

Regional ponds can be used provided that they are constructed ponds, not a natural wetland or waterbody, (wetlands used as regional ponds must be mitigated for, see Appendix A) and designed in accordance with this permit's design requirements (see Part III.C.1) for all water from impervious surfaces that reach the pond. Permittees shall not construct regional ponds in wetlands, regardless of their condition, quality or designation by local plans, unless the mitigative sequence in Appendix A. D.2 of this permit has been completed. There must be no significant degradation of the waterways between the project and the regional pond. The owner must obtain written authorization from the applicable local governmental unit (LGU) or private entity that owns and maintains the regional pond. The LGU's or private entity's written authorization must identify that the regional pond will discharge the water quality volume ($\frac{1}{2}$ inch of runoff from the impervious watershed area) at no more than 5.66 cfs per acre of surface area of the pond. The owner must include the LGU's or private entity's written authorization in the SWPPP. The LGU's or private entity's written authorization must be obtained before the owner finalizes the SWPPP and before any application for this permit is made to the MPCA.

4. Combination of Practices

A combination of practices, including those required by a LGU, which meet the requirements of Part III.C.1, 2 and 3 respectively, (i.e., wet sedimentation basins, infiltration/filtration, and regional ponds) may be used such that the water quality volume of $\frac{1}{2}$ inch of runoff from the new impervious surfaces created by the project is accounted for in the owner's permanent storm water management system (e.g., $\frac{1}{4}$ inch infiltrated and $\frac{1}{4}$ inch treated through a wet sedimentation basin). If any combination of these practices is used, the SWPPP must contain documentation (e.g., LGU or private entity's authorization, infiltration computer model results or calculations, etc.) identifying the volume that each practice addresses.

5. Alternative Method

Where an alternative, innovative treatment system is proposed and demonstrated by calculation, design or other independent methods to achieve approximately 80% removal of total suspended solids on an annual average basis, the Commissioner will approve the method if the process outlined in Part II.B.3.c. is completed, and the following information is submitted:

- a. All calculations, drainage areas, plans, and specifications for the proposed alternative method and a graphic representation of the area to be served by the method. These items must be included in the SWPPP and submitted to the MPCA at least 90 days prior to the proposed starting date of the construction activity.
- b. A 2 year monitoring plan to sample runoff from the proposed method. The plan must include a discussion of the methods used to collect samples, location where samples will be taken (upstream and downstream of the proposed method), frequency of samples (minimum of six

runoff events sampled), identify lab used to analyze the samples and quality assurance and quality control methods to be used. The plan must include a schedule for submitting the monitoring data annually.

- c. A mitigation plan that addresses how the water quality volume will be treated in the event that the monitoring data shows the proposed alternative treatment method does not function as designed.
- d. The alternative method must achieve approximately 80% removal of total suspended solids on an average annual basis for the conditions expected at the site. The design must also consider public safety, health and water quality concerns. Proprietary information on effectiveness will not be considered for alternative treatment method review and approval.

No construction activity on the project is covered under this permit until the applicant receives an alternative treatment approval letter from the MPCA as described in Part II.B.3.c.

D. RECORD RETENTION

The SWPPP, all changes to it, and inspections and maintenance records must be kept at the site during construction by the Permittee who has operational control of that portion of the site. The SWPPP can be kept in either the field office or in an on site vehicle.

All owner(s) must keep the SWPPP, along with the following additional records, on file for three years after submittal of the NOT as outlined in Part II.C. This does not include any records after submittal of the NOT.

1. Any other permits required for the project;
2. Records of all inspection and maintenance conducted during construction (see Part IV.E. Inspections and Maintenance);
3. All permanent operation and maintenance agreements that have been implemented, including all right of way, contracts, covenants and other binding requirements regarding perpetual maintenance; and
4. All required calculations for design of the temporary and permanent storm water management systems.

PART IV. CONSTRUCTION ACTIVITY REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN

The Permittee(s) must implement the SWPPP and the requirements of this part. The Best Management Practices (BMPs) identified in the SWPPP and in this permit must be installed in an appropriate and functional manner.

B. EROSION PREVENTION PRACTICES

1. The Permittee(s) must plan for and implement appropriate construction phasing, vegetative buffer strips, horizontal slope grading, and other construction practices that minimize erosion, so

that the inspection and maintenance requirements of Part IV.E. are complied with. The location of areas not to be disturbed must be delineated (e.g. with flags, stakes, signs, silt fence etc.) on the development site before work begins.

2. All exposed soil areas with a continuous positive slope within 200 lineal feet of a surface water, must have temporary erosion protection or permanent cover for the exposed soil areas year round, according to the following table of slopes and time frames:

<u>Type of Slope</u>	<u>Time</u>	(Maximum time an area can remain open when the area is not actively being worked.)
Steeper than 3:1	7 days	
10:1 to 3:1	14 days	
Flatter than 10:1	21 days	

These areas include constructed storm water management pond side slopes, and any exposed soil areas with a positive slope to a storm water conveyance system, such as a curb and gutter system, storm sewer inlet, temporary or permanent drainage ditch or other natural or man made systems that discharge to a surface water. Temporary stockpiles without significant silt, clay or organic components (e.g., clean aggregate stockpiles, demolition concrete stockpiles, sand stockpiles) are exempt from this requirement but must comply with Part IV.C.5.

3. The normal wetted perimeter of any temporary or permanent drainage ditch that drains water from a construction site, or diverts water around a site, must be stabilized within 200 lineal feet from the property edge, or from the point of discharge to any surface water. Stabilization must be completed within 24 hours of connecting to a surface water.
4. Pipe outlets must be provided with temporary or permanent energy dissipation within 24 hours of connection to a surface water.

C. SEDIMENT CONTROL PRACTICES

1. Sediment control practices must minimize sediment from entering surface waters, including curb and gutter systems and storm sewer inlets.
 - a. Temporary or permanent drainage ditches and sediment basins that are designed as part of a treatment system (e.g., ditches with rock check dams) require sediment control practices only as appropriate for site conditions.
 - b. If the down gradient treatment system is overloaded, additional upgradient sediment control practices must be installed to eliminate the overloading, and the SWPPP must be amended to identify these additional practices as required in Part III.A.4, a. through c.
 - c. In order to maintain sheet flow and minimize rills and/or gullies, there shall be no unbroken slope length of greater than 75 feet for slopes with a grade of 3:1 or steeper.
2. Sediment control practices must be established on all down gradient perimeters before any upgradient land disturbing activities begin. These practices shall remain in place until final stabilization has been established in accordance with Part IV.G.

3. The timing of the installation of sediment control practices may be adjusted to accommodate short-term activities such as clearing or grubbing, or passage of vehicles. Any short-term activity must be completed as quickly as possible and the sediment control practices must be installed immediately after the activity is completed. However, sediment control practices must be installed before the next precipitation event even if the activity is not complete.
4. All storm drain inlets must be protected by appropriate BMPs during construction until all sources with potential for discharging to the inlet have been stabilized.
5. Temporary soil stockpiles must have silt fence or other effective sediment controls, and cannot be placed in surface waters, including storm water conveyances such as curb and gutter systems, or conduits and ditches.
6. Vehicle tracking of sediment from the construction site must be minimized by BMPs such as stone pads, concrete or steel wash racks, or equivalent systems. Street sweeping must be used if such BMPs are not adequate to prevent sediment from being tracked onto the street (see Part IV.E.4.d.).
7. The Permittee must install temporary sedimentation basins as required in Part III.B. of this permit.

D. DEWATERING AND BASIN DRAINING

1. Dewatering or basin draining (e.g., pumped discharges, trench/ditch cuts for drainage) related to the construction activity that may have turbid or sediment laden discharge water must be discharged to a temporary or permanent sedimentation basin on the project site whenever possible. If the water cannot be discharged to a sedimentation basin prior to entering the surface water, it must be treated with the appropriate BMPs, such that the discharge does not adversely affect the receiving water or downstream landowners. The Permittee(s) must ensure that discharge points are adequately protected from erosion and scour. The discharge must be dispersed over natural rock riprap, sand bags, plastic sheeting or other accepted energy dissipation measures. Adequate sedimentation control measures are required for discharge water that contains suspended solids.
2. All water from dewatering or basin draining activities must be discharged in a manner that does not cause nuisance conditions, erosion in receiving channels or on downslope properties, or inundation in wetlands causing significant adverse impact to the wetland.

E. INSPECTIONS AND MAINTENANCE

1. The Permittee(s) (either the owner or operator, whoever is identified in the SWPPP) must routinely inspect the construction site once every seven (7) days during active construction and within 24 hours after a rainfall event greater than 0.5 inches in 24 hours.
2. All inspections and maintenance conducted during construction must be recorded in writing and these records must be retained with the SWPPP in accordance with Part III.D. Records of each inspection and maintenance activity shall include:
 - a. Date and time of inspections;

- b. Name of person(s) conducting inspections;
 - c. Findings of inspections, including recommendations for corrective actions;
 - d. Corrective actions taken (including dates, times, and party completing maintenance activities);
 - e. Date and amount of all rainfall events greater than 1/2 inch (0.5 inches) in 24 hours; and
 - f. Documentation of changes made to the SWPPP as required in Part III.A.4.
3. Where parts of the construction site have undergone final stabilization, but work remains on other parts of the site, inspections of the stabilized areas may be reduced to once per month. Where work has been suspended due to frozen ground conditions, the required inspections and maintenance must take place as soon as runoff occurs at the site or prior to resuming construction, whichever comes first.
4. All erosion prevention and sediment control BMPs must be inspected to ensure integrity and effectiveness. All nonfunctional BMPs must be repaired, replaced, or supplemented with functional BMPs. The Permittee(s) must investigate and comply with the following inspection and maintenance requirements:
- a. All silt fences must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches 1/3 of the height of the fence. These repairs must be made within 24 hours of discovery, or as soon as field conditions allow access.
 - b. Temporary and permanent sedimentation basins must be drained and the sediment removed when the depth of sediment collected in the basin reaches 1/2 the storage volume. Drainage and removal must be completed within 72 hours of discovery, or as soon as field conditions allow access (see Part IV.D.).
 - c. Surface waters, including drainage ditches and conveyance systems, must be inspected for evidence of sediment being deposited by erosion. The Permittee(s) must remove all deltas and sediment deposited in surface waters, including drainage ways, catch basins, and other drainage systems, and restabilize the areas where sediment removal results in exposed soil. The removal and stabilization must take place within seven (7) days of discovery unless precluded by legal, regulatory, or physical access constraints. The Permittee shall use all reasonable efforts to obtain access. If precluded, removal and stabilization must take place within seven (7) calendar days of obtaining access. The Permittee is responsible for contacting all local, regional, state and federal authorities and receiving any applicable permits, prior to conducting any work.
 - d. Construction site vehicle exit locations must be inspected for evidence of off-site sediment tracking onto paved surfaces. Tracked sediment must be removed from all off-site paved surfaces, within 24 hours of discovery, or if applicable, within a shorter time to comply with Part IV.C.6.
 - e. The Permittee(s) are responsible for the operation and maintenance of temporary and permanent water quality management BMPs, as well as all erosion prevention and sediment control BMPs, for the duration of the construction work at the site. The

Permittee(s) are responsible until another Permittee has assumed control according to Part II.B.5 over all areas of the site that have not been finally stabilized or the site has undergone final stabilization, and a NOT has been submitted to the MPCA.

- f. If sediment escapes the construction site, off-site accumulations of sediment must be removed in a manner and at a frequency sufficient to minimize off-site impacts (e.g., fugitive sediment in streets could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).
5. All infiltration areas must be inspected to ensure that no sediment from ongoing construction activities is reaching the infiltration area and these areas are protected from compaction due to construction equipment driving across the infiltration area.

F. POLLUTION PREVENTION MANAGEMENT MEASURES

The Permittee(s) shall implement the following pollution prevention management measures on the site:

1. Solid Waste: Collected sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes must be disposed of properly and must comply with MPCA disposal requirements.
2. Hazardous Materials: Oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spills, leaks or other discharge. Restricted access to storage areas must be provided to prevent vandalism. Storage and disposal of hazardous waste must be in compliance with MPCA regulations.
3. External washing of trucks and other construction vehicles must be limited to a defined area of the site. Runoff must be contained and waste properly disposed of. No engine degreasing is allowed on site.

G. FINAL STABILIZATION

The Permittee(s) must ensure final stabilization of the site. The Permittee(s) must submit a NOT within 30 days after final stabilization is complete, or another owner/operator (Permittee) has assumed control according to Part II.B.5 over all areas of the site that have not undergone final stabilization. Final stabilization can be achieved in one of the following ways:

1. All soil disturbing activities at the site have been completed and all soils must be stabilized by a uniform perennial vegetative cover with a density of 70 percent over the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions and;
 - a. All drainage ditches, constructed to drain water from the site after construction is complete, must be stabilized to preclude erosion;
 - b. All temporary synthetic, and structural erosion prevention and sediment control BMPs (such as silt fence) must be removed as part of the site final stabilization; and
 - c. The Permittee(s) must clean out all sediment from conveyances and from temporary sedimentation basins that are to be used as permanent water quality management basins.

Sediment must be stabilized to prevent it from being washed back into the basin, conveyances or drainageways discharging off-site or to surface waters. The cleanout of permanent basins must be sufficient to return the basin to design capacity.

2. For residential construction only, final stabilization has been achieved when temporary erosion protection and down gradient perimeter control for individual lots has been completed and the residence has been transferred to the homeowner. Additionally, the Permittee must distribute the MPCA "homeowner factsheet" to the homeowner to inform the homeowner of the need for, and benefits of, final stabilization.

PART V. GENERAL PROVISIONS

A. APPLICABILITY CRITERIA

1. If the Commissioner determines that storm water discharges associated with a construction activity are contributing to a violation of a water quality standard or would be more appropriately regulated by an individual permit, the Commissioner may require the owner to be covered by an individual storm water discharge permit. The Commissioner may require the owner to develop and implement specific BMPs and monitor the discharge from the site. If applicable, upon issuance of an individual permit, this general permit would no longer apply.
2. If the terms and conditions of this general permit cannot be met, an owner may request an individual permit, in accordance with Minn. R. 7001.

B. RESPONSE

The SWPPP, including all certificates, reports, records, or other information required by this permit, must be made available to federal, state, and local officials within 72 hours upon request for the duration of the permit and for three years following the NOT. This does not include any records after submittal of the NOT.

C. PROHIBITIONS

This permit prohibits discharges of any material other than storm water, and discharges from dewatering or basin draining activities in accordance with Part IV.D.1 and 2. For example, prohibited discharges include but are not limited to vehicle and equipment washing, maintenance spills, wash water, and discharges of oil and other hazardous substances.

D. TRANSFER OF OWNERSHIP OR CONTROL

This permit may not be assigned or transferred by the permit holder except when transfer occurs in accordance with the applicable requirements of Part II.B.5.

E. CIVIL AND CRIMINAL LIABILITY

Nothing in this permit must be construed to relieve the Permittee(s) from civil or criminal penalties for noncompliance with the terms and conditions provided herein. Nothing in this permit must be construed to preclude the initiation of any legal action or relieve the Permittee(s) from any responsibilities, liabilities, or penalties to which the Permittee(s) is or may be subject to under Section 311 of the Act and Minn. Stat. chs. 115 and 116, as amended. The Permittee(s) are not

liable for permit requirements for activities occurring on those portions of a site where another party has submitted a subdivision short form registration as described in Part II. B.5 or a NOT has been issued by the MPCA except for responsibilities listed under Part III.C.5 if applicable.

F. SEVERABILITY

The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit must not be affected thereby.

G. NPDES/SDS RULE STANDARD CONDITIONS

The Permittee(s) must comply with the provisions of Minn. R. 7001.0150, subp. 3 and 7001.1090, subp. 1.A,B,C,H,I. This permit does not require the submittal of a data monitoring report, except where monitoring is required in Part III.C.5.

H. INSPECTION AND ENTRY

The Permittee(s) must comply with the provisions of 40 CFR 122.41(i), Minn. Stat. Ch. 115.04 and Minn. Stat. Ch. 115B.17. The Permittee(s) shall allow representatives of the MPCA or any member, employee or agent thereof, when authorized by it, upon presentation of credentials, to enter upon any property, public or private, for the purpose of obtaining information or examination of records or conducting surveys or investigations.

APPENDIX A

A. GENERAL REQUIREMENTS

All requirements in this Appendix are in addition to BMPs already specified in the permit. Where provisions of Appendix A conflict with requirements elsewhere in the permit, the provisions in Appendix A take precedence. All BMPs used to comply with this Appendix must be documented in the SWPPP for the project. If the terms and conditions of this Appendix cannot be met, an individual permit will be required in accordance with Minn. R. ch. 7001.

B. REQUIREMENTS FOR DISCHARGES TO SPECIAL WATERS

Additional BMPs together with enhanced runoff controls, are required for discharges to the following special waters (part B.1 through B.8 of Appendix A). The BMPs identified for each special water are required for those areas of the project draining to a discharge point on the project that is within 2000 feet of a special water and flows to that special water.

1. **Wilderness areas:** Boundary Waters Canoe Area Wilderness; Voyageurs National Park; Kettle River from the site of the former dam at Sandstone to its confluence with the Saint Croix River; Rum River from Ogechie Lake spillway to the northernmost confluence with Lake Onamia. Discharges to these waters must incorporate the BMPs outlined in C.1, C.2, C.3 and C.4 of this appendix.
2. **Mississippi River:** Those portions from Lake Itasca to the southerly boundary of Morrison County that are included in the Mississippi Headwaters Board comprehensive plan dated

February 12, 1981. Discharges to these waters must incorporate the BMPs outlined in C.1, C.2 and C.3 of this appendix.

3. **Scenic or recreational river segments:** Saint Croix river, entire length; Cannon River from northern city limits of Faribault to its confluence with the Mississippi River; North Fork of the Crow River from Lake Koronis outlet to the Meeker-Wright county line; Kettle River from north Pine County line to the site of the former dam at Sandstone; Minnesota River from Lac qui Parle dam to Redwood County state aid highway 11; Mississippi River from county state aid highway 7 bridge in Saint Cloud to northwestern city limits of Anoka; and Rum River from state aid Highway 27 bridge in Onamia to Madison and Rice streets in Anoka. Discharges to these waters must incorporate the BMPs outlined in C.1, C.2 and C.3 of this appendix.
4. **Lake Superior:** (prohibited and restricted) Discharges to Lake Superior must incorporate the BMPs outlined in C.1, C.2 and C.3 of this appendix.
5. **Lake Trout Lakes:** Identified in Minn. R. 7050.0470, including those inside the boundaries of the Boundary Waters Canoe Area Wilderness and Voyageurs National Park. Discharges to these waters must incorporate the BMPs outlined in C.1, C.2, C.3 and C.4 of this appendix.
6. **Trout Lakes:** identified in Minn. R. 6264.0050, subp. 2. Discharges to these waters must incorporate the BMPs outlined in C.1, C.2, C.3, and C.4 of this appendix.
7. **Scientific and natural areas:** Boot Lake, Anoka County; Kettle River in sections 15, 22, 23, T 41 N, R 20, Pine County; Pennington Bog, Beltrami County; Purvis Lake-Ober Foundation, Saint Louis County; Waters within the borders of Itasca Wilderness Sanctuary, Clearwater County; Iron Springs Bog, Clearwater County; Wolsfeld Woods, Hennepin County; Green Water Lake, Becker County; Blackdog Preserve, Dakota County; Prairie Bush Clover, Jackson County; Black Lake Bog, Pine County; Pembina Trail Preserve, Polk County; and Falls Creek, Washington County. Discharges to these waters must incorporate the BMPs outlined in C.1, C.2, C.3 and C.4 of this appendix.
8. **Trout Streams:** listed in Minn. R. 6264.0050, subp. 4. Discharges to these waters must incorporate the BMPs outlined in Appendix A C.1, C.2, C.3, and C.5 of this appendix.

C. ADDITIONAL BMPs FOR SPECIAL WATERS

For the BMPs described in C.2, C.4 and C.5 of this Appendix:

Where the proximity to bedrock precludes the installation of any of the permanent storm water management practices outlined in Appendix A, other treatment such as grassed swales, smaller ponds, or grit chambers is required prior to discharge to surface waters.

For work on road projects where the lack of right of way precludes the installation of any of the permanent storm water management practices outlined in Appendix A, other treatment such as grassed swales, smaller ponds, or grit chambers is required prior to discharge to surface waters.

1. During construction.

- a. All exposed soil areas with a slope of 3:1 or steeper, that have a continuous positive slope to a special water must have temporary erosion protection or permanent cover within 3 days

after the area is no longer actively being worked. All other slopes that have a continuous positive slope to a special water must have temporary erosion protection or permanent cover within 7 days after the area is no longer actively being worked.

- b. Temporary sediment basin requirements described in Part III.B.1-5 must be used for common drainage locations that serve an area with five (5) or more acres disturbed at one time.
2. Post construction. The water quality volume that must be treated by the project's permanent storm water management system described in Part III.C. shall be one (1) inch of runoff from the new impervious surfaces created by the project.
3. Buffer zone. An undisturbed buffer zone of not less than 100 linear feet from the special water (not including tributaries) shall be maintained at all times. Exceptions from this requirement for areas, such as water crossings or limited water access, are allowed if the Permittee fully documents in the SWPPP the circumstances and reasons that the buffer encroachment is necessary. All potential water quality, scenic and other environmental impacts of these exceptions must be minimized and documented in the SWPPP for the project.
4. Enhanced runoff controls. The permanent storm water management system must be designed such that the pre and post project runoff rate and volume from the 1, and 2-year 24-hour precipitation events remains the same.
5. Temperature Controls. The permanent storm water management system must be designed such that the discharge from the project will minimize any increase in the temperature of trout stream receiving waters resulting from the 1, and 2-year 24-hour precipitation events. This includes all tributaries of designated trout streams within the section that the trout stream is located. Projects that discharge to trout streams must minimize the impact using one or more of the following measures, in order of preference:
 - a. Minimize new impervious surfaces.
 - b. Minimize the discharge from connected impervious surfaces by discharging to vegetated areas, or grass swales, and through the use of other non-structural controls.
 - c. Infiltration or evapotranspiration of runoff in excess of pre-project conditions (up to the 2-year 24-hour precipitation event).
 - d. If ponding is used, the design must include an appropriate combination of measures such as shading, filtered bottom withdrawal, vegetated swale discharges or constructed wetland treatment cells that will limit temperature increases. The pond should be designed to draw down in 24 hours or less.
 - e. Other methods that will minimize any increase in the temperature of the trout stream.

D. REQUIREMENTS FOR DISCHARGING TO WETLANDS

If the project has any storm water discharges with the potential for significant adverse impacts to a wetland (e.g., conversion of a natural wetland to a storm water pond), the Permittee(s) must demonstrate that the wetland mitigative sequence has been followed in accordance with D.1 or D.2 of this appendix.

1. If the potential adverse impacts to a wetland on a specific project site have been addressed by permits or other approvals from an official statewide program (U.S. Army Corps of Engineers 404 program, Minnesota Department of Natural Resources, or the State of Minnesota Wetland

Conservation Act) that are issued specifically for the project and project site, the Permittee may use the permit or other determination issued by these agencies to show that the potential adverse impacts have been addressed. For the purposes of this permit, de minimus actions are determinations by the permitting agency that address the project impacts, whereas a non-jurisdictional determination does not address project impacts.

2. If there are impacts from the project that are not addressed in one of the permits or other determinations discussed in Appendix A, Part D.1 (e.g., permanent inundation or flooding of the wetland, significant degradation of water quality, excavation, filling, draining), the Permittee must minimize all adverse impacts to wetlands by utilizing appropriate measures. Measures used must be based on the nature of the wetland, its vegetative community types and the established hydrology. These measures include in order of preference:
 - a. Avoid all significant adverse impacts to wetlands from the project and post project discharge.
 - b. Minimize any unavoidable impacts from the project and post project discharge.
 - c. Provide compensatory mitigation when the Permittee determines that there is no reasonable and practicable alternative to having a significant adverse impact on a wetland. For compensatory mitigation, wetland restoration or creation shall be of the same type, size and whenever reasonable and practicable in the same watershed as the impacted wetland.

E. DISCHARGES REQUIRING ENVIRONMENTAL REVIEW

This permit does not replace or satisfy any environmental review requirements, including those under the Minnesota Environmental Policy Act (MEPA) or the National Environmental Policy Act (NEPA). The owner must complete any environmental review required by law, including any required Environmental Assessment Work Sheets or Environmental Impact Statements, Federal environmental review, or other required review.

F. DISCHARGES AFFECTING ENDANGERED OR THREATENED SPECIES

This permit does not replace or satisfy any review requirements for Endangered or Threatened species, from new or expanded discharges that adversely impact or contribute to adverse impacts on a listed endangered or threatened species or adversely modify a designated critical habitat. The owner must conduct any required review and coordinate with appropriate agencies for any project with the potential of affecting threatened or endangered species, or their critical habitat.

G. DISCHARGES AFFECTING HISTORIC PLACES OR ARCHEOLOGICAL SITES

This permit does not replace or satisfy any review requirements for Historic Places or Archeological Sites, from new or expanded discharges which adversely affect properties listed or eligible for listing in the National Register of Historic Places or affecting known or discovered Archeological Sites. The owner must be in compliance with National Historic Preservation Act and conduct all required review and coordination related to historic preservation, including significant anthropological sites and any burial sites, with the Minnesota Historic Preservation Officer.

APPENDIX B. DEFINITIONS

1. "Best Management Practices (BMPs)" means erosion and sediment control and water quality management practices that are the most effective and practicable means of controlling, preventing, and minimizing degradation of surface water, including avoidance of impacts, construction-phasing, minimizing the length of time soil areas are exposed, prohibitions, and other management practices published by state or designated area-wide planning agencies.

Individual BMPs found in this permit are described in the current version of Protecting Water Quality in Urban Areas, Minnesota Pollution Control Agency 2000. BMPs must be adapted to the site and can be adopted from other sources. However, they must be similar in purpose and at least as effective and stringent as MPCA's BMPs. (Other sources include manufacturers specifications, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, U.S. Environmental Protection Agency 1992, and Erosion Control Design Manual, Minnesota Department of Transportation, et al, 1993).

2. "Commissioner" means the Commissioner of the Minnesota Pollution Control Agency or the Commissioner's designee.
3. "Common Plan of Development or Sale" means a contiguous area where multiple separate and distinct land disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. One plan is broadly defined to include design, permit application, advertisement or physical demarcation indicating that land-disturbing activities may occur.
4. "Construction Activity" For this permit, construction activity includes construction activity as defined in 40 C.F.R. part 122.26(b)(14)(x) and small construction activity as defined in 40 C.F.R. part 122.26(b)(15). This includes a disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non-vegetative), or the existing soil topography that may result in accelerated storm water runoff, leading to soil erosion and movement of sediment into surface waters or drainage systems. Examples of construction activity may include clearing, grading, filling and excavating. Construction activity includes the disturbance of less than one acre of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb one (1) acre or more.
5. "Dewatering" means the removal of water for construction activity. It can be a discharge of appropriated surface or groundwater to dry and/or solidify a construction site. It may require Minnesota Department of Natural Resources permits to be appropriated and if contaminated may require other MPCA permits to be discharged.
6. "Energy Dissipation" means methods employed at pipe outlets to prevent erosion. Examples include, but are not limited to: concrete aprons, riprap, splash pads, and gabions that are designed to prevent erosion.
7. "Erosion Prevention" means measures employed to prevent erosion including but not limited to: soil stabilization practices, limited grading, mulch, temporary or permanent cover, and construction phasing.
8. "Final Stabilization" means that either:
 - a. All soil disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the

native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed;

- b. For individual lots in residential construction by either: (a) The homebuilder completing final stabilization as specified above, or (b) the homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off sidewalks and driveways.); or
 - c. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land) final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to surface waters and drainage systems, and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria in (a) or (b) above.
9. "General Contractor" means the party who signs the construction contract with the owner to construct the project described in the final plans and specifications. Where the construction project involves more than one contractor, the general contractor will be the party responsible for managing the project on behalf of the owner. In some cases, the owner may be the general contractor. In these cases, the owner may contract an individual as the operator who would become the Co-Permittee.
10. "Homeowner Factsheet" means a fact sheet developed by the MPCA to be given to homeowners at the time of sale by a builder to inform the homeowner of the need for, and benefits of, final stabilization.
11. "Impervious Surface" means a constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than prior to development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads.
12. "National Pollutant Discharge Elimination System (NPDES)" means the program for issuing, modifying, revoking, reissuing, terminating, monitoring, and enforcing permits under the Clean Water Act (Sections 301, 318, 402, and 405) and United States Code of Federal Regulations Title 33, Sections 1317, 1328, 1342, and 1345..
13. "Normal Wetted Perimeter" means the area of a conveyance, such as a ditch, channel, or pipe that is in contact with water during flow events that are expected to occur once every year.
14. "Notice of Termination" means notice to terminate coverage under this permit after construction is complete, the site has undergone final stabilization, and maintenance agreements for all permanent facilities have been established, in accordance with all applicable conditions of this permit. Notice of Termination forms are available from the MPCA.
15. "Operator" means the person (usually the general contractor), designated by the owner, who has day to day operational control and/or the ability to modify project plans and specifications related to

the SWPPP. The person must be knowledgeable in those areas of the permit for which the operator is responsible, (Part II.B. and Part IV.) and must perform those responsibilities in a workmanlike manner.

16. "Owner" means the person or party possessing the title of the land on which the construction activities will occur; or if the construction activity is for a lease holder, the party or individual identified as the lease holder; or the contracting government agency responsible for the construction activity.
17. "Permanent Cover" means final stabilization. Examples include grass, gravel, asphalt, and concrete.
18. "Permittee" means a person or persons, firm, or governmental agency or other institution that signs the application submitted to the MPCA and is responsible for compliance with the terms and conditions of this permit.
19. "Saturated Soil" means the highest seasonal elevation in the soil that is in a reduced chemical state because of soil voids being filled with water. Saturated soil is evidenced by the presence of redoximorphic features or other information.
20. "Sediment Control" means methods employed to prevent sediment from leaving the site. Sediment control practices include silt fences, sediment traps, earth dikes, drainage swales, check dams, subsurface drains, pipe slope drains, storm drain inlet protection, and temporary or permanent sedimentation basins.
21. "Small Construction Activity" means small construction activity as defined in 40 C.F.R. part 122.26(b)(15). Small construction activities include clearing, grading and excavating that result in land disturbance of equal to or greater than one acre and less than five acres. Small construction activity includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one and less than five (5) acres.
22. "Stabilized" means the exposed ground surface has been covered by appropriate materials such as mulch, staked sod, riprap, wood fiber blanket, or other material that prevents erosion from occurring. Grass seeding is not stabilization.
23. "Standard Plates" means general drawings having or showing similar characteristics or qualities that are representative of a construction practice or activity.
24. "Storm water" is defined under Minn. R. 7077.0105, subp. 41(b), and includes precipitation runoff, storm water runoff, snow melt runoff, and any other surface runoff and drainage.
25. "Storm Water Pollution Prevention Plan" means a plan for storm water discharge that includes erosion prevention measures and sediment controls that, when implemented, will decrease soil erosion on a parcel of land and decrease off-site nonpoint pollution.
26. "Surface Water or Waters" means all streams, lakes, ponds, marshes, wetlands, reservoirs, springs, rivers, drainage systems, waterways, watercourses, and irrigation systems whether natural or artificial, public or private.

27. "Temporary Erosion Protection" means methods employed to prevent erosion. Examples of temporary cover include; straw, wood fiber blanket, wood chips, and erosion netting.
28. "Underground Waters" means water contained below the surface of the earth in the saturated zone including, without limitation, all waters whether under confined, unconfined, or perched conditions, in near surface unconsolidated sediment or regolith, or in rock formations deeper underground. The term ground water shall be synonymous with underground water.
29. "Waters of the State" (as defined in Minn. Stat. § 115.01, subd. 22) means all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof.
30. "Water Quality Volume" means $\frac{1}{2}$ inch of runoff from the new impervious surfaces created by this project and is the volume of water to be treated in the permanent storm water management system, as required by this permit except as provided in Appendix A.C.2.
31. "Wetland" or "Wetlands" is defined in Minn. R. 7050.0130, subp. F and includes those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Constructed wetlands designed for wastewater treatment are not waters of the state. Wetlands must have the following attributes:
- a. A predominance of hydric soils;
 - b. Inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and
 - c. Under normal circumstances support a prevalence of such vegetation.

SECTION 04810 - UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Concrete masonry units (CMUs).
 - 2. Decorative concrete masonry units.
- B. See Division 5 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
- C. See Division 7 Section "Sheet Metal Flashing and Trim" for furnishing manufactured reglets installed in masonry joints for metal flashing.
- D. Allowances: The following are included under the allowances indicated as specified in Division 1 Section "Allowances":
 - 1. Face brick under the Face Brick Allowances.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
- C. Samples for each type and color of exposed masonry units.
- D. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards.
 - 1. For masonry units include material test reports substantiating compliance with requirements.
- E. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.

1.3 QUALITY ASSURANCE

- A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be made by Owner.

1. Clay Masonry Unit Test: For each type of unit required, per ASTM C 67.
 2. Concrete Masonry Unit Test: For each type of unit required, per ASTM C 140.
 3. Mortar Test (Property Specification): For each mix required, per ASTM C 780.
 4. Grout Test (Compressive Strength): For each mix required, per ASTM C 1019.
- B. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.
- C. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects.
1. Build sample panels for typical exterior wall in sizes approximately 48 inches long by 48 inches high.

1.4 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Products: Subject to compliance with requirements, provide one of the products specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 COLORS, TEXTURES, AND PATTERNS

- A. Exposed Masonry Units: As indicated by manufacturer's designations.

2.3 CONCRETE MASONRY UNITS (CMUs)

- A. Shapes: Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Integral Water Repellent: Provide units made with liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength for exposed units.
 - 1. Available Products:
 - a. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block.
- C. Concrete Masonry Units: ASTM C 90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1500psi.
 - 2. Weight Classification: Normal weight.
 - 3. Pattern and Texture for Decorative Units:
 - a. Standard pattern, ground finish.

2.4 BRICK

- A. General: Provide shapes indicated and as follows:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick: ASTM C 216, Grade SW, Type FBX.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
 - 2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
 - 3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 - 4. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet.
 - 5. Size (Actual Dimensions): 3 5/8" wide by 3 5/8" high by 11 5/8" long.
 - 6. Texture: Smooth
 - 7. Color: Belden 461-463, or approved equal.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 270 and C 476, Type I or II, except Type III may be used for cold-weather construction.

B. Aggregate for Mortar: ASTM C 144.

1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

C. Aggregate for Grout: ASTM C 404.

D. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.

1. Products:

- a. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.

E. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60

B. Masonry Joint Reinforcement: ASTM A 951; mill galvanized, carbon-steel wire for interior walls and hot-dip galvanized, carbon-steel wire for exterior walls.

1. Wire Size for Side Rods: W1.7 or 0.148-inch diameter.
2. Wire Size for Cross Rods: W1.7 or 0.148-inch diameter.
3. Wire Size for Veneer Ties: W1.7 or 0.148-inch diameter.
4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
5. Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.7 TIES AND ANCHORS

A. Materials:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Wire: Fabricate from 3/16-inch- 1/4-inch- diameter, hot-dip galvanized steel wire.

C. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch- 0.25-inch- diameter, hot-dip galvanized steel wire.
 3. Connector Section for Concrete: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.053-inch- 0.097-inch- thick, steel sheet, galvanized after fabrication.
- D. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M, Epoxy coating 0.020 inch thick.
- E. Adjustable Masonry-Veneer Anchors
1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch
 2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, and slotted holes for inserting wire tie.
 - b. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.188-inch diameter, hot-dip galvanized steel wire.
 - c. Products:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213 or D/A 210 with D/A 700-708.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with Division 7 Section "Sheet Metal Flashing and Trim."
- B. Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.030 inch.

a. Products:

- 1) Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
- 2) Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier-44.
- 3) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.

C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 7 Section "Sheet Metal Flashing and Trim."

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.

B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.11 INSULATION

A. Loose-Granular Fill Insulation: Perlite complying with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, closed-cell product extruded with an integral skin.

2.12 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains from new masonry without damaging masonry. Use product approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.13 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement and lime.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification.

1. For masonry below grade or in contact with earth, use Type M
2. For reinforced masonry, use Type S
3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
4. For interior non-load-bearing partitions, Type O may be used instead of Type N.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
- C. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet or 1/2 inch maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 or 1/2 inch maximum.

3.2 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
- E. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and concrete masonry units as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, pilasters and starting courses on footings.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.4 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners.
 - 2. Embed tie sections in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 32 inches o.c. horizontally with not less than 1 anchor for each 3.5 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.5 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Install flashing as follows, unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing as recommended by flashing manufacturer.
 - 2. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

- C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

- 1. Space weep holes 24 inches o.c., unless otherwise indicated.

3.6 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

- 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602

- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

- 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches

3.7 FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.

- 1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

- B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:

- 1. Payment for these services will be made by Owner

- C. Mortar Test (Property Specification): For each mix provided, per ASTM C 780. Test mortar for mortar air content and compressive strength.

- D. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.

3.8 CLEANING

- A. **In-Progress Cleaning:** Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. **Final Cleaning:** After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 2. Protect adjacent surfaces from contact with cleaner.
 - 3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

END OF SECTION 04810

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Exterior load-bearing wall framing.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1.3 SUBMITTALS

- A. Product Data: For each type of product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners.

1.4 QUALITY ASSURANCE

- A. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements.
- B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code--Sheet Steel."
- C. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
1. Grade: ST33H, ST50H [As required by structural performance]
 2. Coating: G60, A60, AZ50, or GF30 G90 or equivalent

2.2 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and same minimum base-metal thickness as steel studs.
- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:

2.3 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members, unless otherwise indicated.
- B. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
- C. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel headless, hooked bolts and carbon-steel nuts; and flat, hardened-steel washers.
- D. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- E. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- F. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.4 MISCELLANEOUS MATERIALS

- A. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- B. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

- A. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- B. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
- C. Install framing members in one-piece lengths.
- D. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- F. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 FIELD QUALITY CONTROL

- A. Field and shop welds will be subject to testing and inspecting.
- B. Testing agency will report test results promptly and in writing to Contractor and Architect.
- C. Remove and replace work where test results indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Loose bearing and leveling plates.
2. Steel weld plates and angles.
3. Loose steel lintels.

B. See Division 5 Section "Metal Stairs" for metal-framed stairs.

C. See Division 5 Section "Pipe and Tube Railings" for metal pipe and tube railings.

1.2 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

B. Templates: For anchors and bolts.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

B. Ferrous Metals:

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
6. Steel Tubing: ASTM A 500, cold-formed steel tubing.
7. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

8. Slotted Channel Framing: Cold-formed metal channels complying with MFMA-3, 1-5/8 by 1-5/8 inches. Channels made from galvanized steel complying with ASTM A 653/A 653M, structural steel, Grade 33 with G90 coating; 0.079-inch nominal thickness.
9. Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

2.3 FASTENERS

- A. General: Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
- B. Cast-in-Place Anchors in Concrete: Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

2.4 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI #79.
- B. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for regalvanizing welds in steel.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.
- D. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.5 FABRICATION

- A. General: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.
 1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
 2. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
 3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
 4. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

5. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 24 inches (600 mm) o.c.
- B. Loose Steel Lintels: Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
 1. Lintels in Exterior Walls: Galvanize
- C. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts.

2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.
- B. Steel and Iron Finishes:
 1. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below for environmental exposure conditions of installed metal fabrications:
 - a. Exteriors (SSPC Zone 1B) SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
 2. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.
 1. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.
 2. Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
 3. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

METAL FABRICATIONS

- B. Set bearing and leveling plates on cleaned surfaces using wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts and pack solidly with nonshrink, nonmetallic grout.
- C. Touch up surfaces and finishes after erection.
 - 1. Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.

END OF SECTION 05500

SECTION 06105 - MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking and nailers.
4. Wood furring and grounds.
5. Wood sleepers.
6. Interior wood trim.
7. Wood shelving and clothes rods.
8. Plywood backing panels.

1.2 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":

1. Dimension lumber framing.
2. Miscellaneous lumber.
3. Interior wood trim.
4. Shelving and clothes rods.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish.
3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWP C2

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 4. Wood framing members that are less than 18 inches above the ground in crawl spaces or unexcavated areas.
 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 19 percent.
- B. Other Framing: Construction, Stud, or No. 3 grade and any of the following species:
 1. Hem-fir (north); NLGA.
 2. Southern pine; SPIB.
 3. Douglas fir-larch; WCLIB or WWP.
 4. Mixed southern pine; SPIB.
 5. Spruce-pine-fir; NLGA.
 6. Douglas fir-south; WWP.
 7. Hem-fir; WCLIB or WWP.
 8. Douglas fir-larch (north); NLGA.
 9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWP.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking.
 2. Nailers.
 3. Rooftop equipment bases and support curbs.
 4. Cants.
 5. Furring.
 6. Grounds.
 7. Utility shelving.

- B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content of any species.
- C. For exposed boards, provide lumber with 19 percent maximum moisture content of eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWP.
- D. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine, No. 3 grade; SPIB.
 - 2. Eastern softwoods, No. 3 Common grade; NELMA.
 - 3. Northern species, No. 3 Common grade; NLGA.
 - 4. Western woods, Standard or No. 3 Common grade; WCLIB or WWP.

2.5 INTERIOR WOOD TRIM

- A. General: Provide kiln-dried finished (surfaced) material without finger-jointing, unless otherwise indicated.
- B. Hardwood Lumber Trim for Transparent (Stain or Clear) Finish: Clear white birch.
- C. Lumber Trim for Opaque (Painted) Finish: Either finger-jointed or solid lumber, of[one of] the following species and grades:
 - 1. Grade Finish eastern white pine; NeLMA or NLGA.
- D. Moldings: Made to patterns included in WMMPA WM 7 and graded according to WMMPA WM 4.
 - 1. Moldings for Transparent (Stain or Clear) Finish: N-grade white birch

2.6 SHELVING AND CLOTHES RODS

- A. Shelving: Made from the following material, 3/4-inch thick.
 - 1. Wood boards of same species and grade indicated above for interior lumber trim for transparent finish.

2.7 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.8 FASTENERS

- A. General: Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Power-Driven Fasteners: NES NER-272.
- C. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Do not splice structural members between supports, unless otherwise indicated.
- D. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- E. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- F. Wood Trim Installation: Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.
 - 1. Match color and grain pattern across joints.
 - 2. Install trim after gypsum board joint-finishing operations are completed.
 - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06105

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior standing and running trim.
2. Wood cabinets.
3. Plastic-laminate cabinets.
4. Plastic-laminate countertops.
5. Shop finishing of woodwork.

B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation.

1.2 SUBMITTALS

A. Product Data: For cabinet hardware and accessories and finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:

1. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge.
2. Plastic-laminates, for each type, color, pattern, and surface finish.
3. Thermoset decorative panels, for each type, color, pattern, and surface finish.

D. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of woodwork.

B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards."

C. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 WOODWORK FABRICATORS

- A. Fabricators: Subject to compliance with requirements, provide interior architectural woodwork by one of the following:

2.2 MATERIALS

- A. Wood Species and Cut for Transparent Finish: white birch, plain sawn.
- B. Wood Products:
 - 1. Medium-Density Fiberboard: ANSI A208.2, Grade MD
 - 2. Softwood Plywood: DOC PS 1
 - 3. Veneer-Faced Panel Products: HPVA HP-1
- C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for items specified in Division 8 Section Door Hardware
- B. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:
 - 1. Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361.
 - 2. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening, self-closing.
- D. Back-Mounted Pulls: BHMA A156.9, B02011.
- E. Wire Pulls: Back mounted, solid metal 4 inches long, 5/16 inch in diameter
- F. Catches: Push-in magnetic catches, BHMA A156.9, B03131
- G. Drawer Slides: BHMA A156.9, B05091.

1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
 2. Box Drawer Slides: Grade 1; for drawers not more than 6 inches high and 24 inches wide.
 3. File Drawer Slides: Grade 1HD-100; for drawers more than 6 inches high or 24 inches wide.
 4. Pencil Drawer Slides: Grade 1; for drawers not more than 3 inches high and 24 inches wide.
- H. Door Locks: BHMA A156.11, E07121.
- I. Drawer Locks: BHMA A156.11, E07041.
- J. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Dark, Oxidized, Satin Bronze, Oil Rubbed: BHMA 613 for bronze base; BHMA 640 for steel base; match Architect's sample.
 2. Bright Brass, Clear Coated: BHMA 605 for brass base; BHMA 632 for steel base.
 3. Bright Chromium Plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.
 4. Satin Stainless Steel: BHMA 630.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

2.6 FABRICATION

- A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
1. Interior Woodwork Grade: Custom.
 2. Shop cut openings to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.
- B. Interior Standing and Running Trim:
1. For transparent-finished trim items wider than available lumber, use veneered construction. Do not glue for width.
 2. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
- C. Plastic-Laminate Cabinets:

1. AWI Type of Cabinet Construction: Flush overlay
2. WI Construction Style: Style A, Frameless
3. WI Construction Type: Type I, multiple self-supporting units rigidly joined together
4. WI Door and Drawer Front Style: Flush overlay
5. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate as follows:
 - a. Horizontal Surfaces Other Than Tops: Grade HGS.
 - b. Postformed Surfaces: Grade HGP.
 - c. Vertical Surfaces: Grade HGS.
 - d. Edges: Grade HGS
7. Materials for Semiexposed Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade VGS
8. Drawer Sides and Backs: Solid-hardwood lumber
9. Drawer Bottoms: Hardwood plywood
10. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range of solid colors, wood grains, patterns, matte finish.
12. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

D. Plastic-Laminate Countertops:

1. High-Pressure Decorative Laminate Grade: HGS.
2. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range of solid colors, wood grains, patterns, matte finish.
3. Edge Treatment: Same as laminate cladding on horizontal surfaces

2.7 SHOP FINISHING

- A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.
- C. Transparent Finish:
 1. Grade: Custom
 2. AWI Finish System: Acrylic lacquer
 3. WI Finish System: 2, water-reducible acrylic lacquer
 4. Staining: Match approved sample for color
 5. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

- B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails [or finishing screws] for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
- G. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
 - 1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips
- H. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

END OF SECTION 06402

SECTION 07131 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Modified bituminous sheet waterproofing.
2. Insulation.

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for waterproofing.
- D. Special warranties.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that is approved or licensed by waterproofing manufacturer for installation of waterproofing required for this Project.
- B. Preinstallation Conference: Conduct conference at Project site.
1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1.5 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to replace waterproofing material that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

- A. Modified Bituminous Sheet: 60-mil- thick, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated to a 4-mil- thick, polyethylene film with release liner on adhesive side

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include.
2. Physical Properties:
 - a. Tensile Strength: 250 psi minimum; ASTM D 412, Die C, modified.
 - b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
 - c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D 1970.
 - d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836.
 - e. Puncture Resistance: 40 lbf minimum; ASTM E 154.
 - f. Hydrostatic-Head Resistance: 150 feet minimum; ASTM D 5385.
 - g. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
 - h. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.

2.2 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

2.3 INSULATION

- A. Board Insulation: Extruded-polystyrene board insulation complying with ASTM C 578, square edged.

1. Type IV, 25-psi minimum compressive strength.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- F. Bridge and cover expansion joints and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips.
 - 1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
- G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
- H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.2 APPLICATION

- A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and according to recommendations in ASTM D 6135.
- B. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure watertight installation.
- C. Horizontal Application: Apply sheets from low point to high point of decks to ensure that side laps shed water.
- D. Apply continuous sheets over sheet strips bridging substrate cracks, construction, and contraction joints.
- E. Install sheet waterproofing and auxiliary materials to tie into adjacent waterproofing.
- F. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.
- G. Install protection course with butted joints over waterproofing membrane immediately.

- H. Correct deficiencies in or remove sheet waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

3.3 INSULATION INSTALLATION

- A. Install over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.
- B. On vertical surfaces, set insulation units in adhesive or tape applied according to manufacturer's written instructions.
- C. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.4 PROTECTION AND CLEANING

- A. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed board insulation from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07131

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Perimeter wall insulation (supporting backfill).
2. Concealed building insulation.
3. Loose-fill building insulation.
4. Vapor retarders.
5. Sound attenuation insulation.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: Full-size units for each type of exposed insulation indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb/cu. Ft with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:

2.3 GLASS-FIBER BATT INSULATION

- A. Unfaced, Glass-Fiber Batt Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- B. Where glass-fiber batt insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:

1. 3-1/2 inches thick with a thermal resistance of [11 deg F x h x sq. ft./Btu at 75 deg F, 13 deg F x h x sq. ft./Btu at 75 deg F
2. 3-5/8 inches thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F
3. 5-1/2 inches thick with a thermal resistance of 21 deg F x h x sq. ft./Btu at 75 deg F
4. 6-1/2 inches thick with a thermal resistance of 19 deg F x h x sq. ft./Btu at 75 deg F

2.4 VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils thick, with maximum permeance rating of 0.13 perm
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.5 AUXILIARY INSULATING MATERIALS

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.
- B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

3.2 INSTALLATION OF PERIMETER INSULATION

- A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
 1. If not otherwise indicated, extend insulation a minimum of 48 inches below exterior grade line.

3.3 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Apply self-supported, spray-applied cellulosic insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make it flush with face of studs by using method recommended by insulation manufacturer.
- D. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

3.4 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.
- C. Before installing vapor retarder, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

END OF SECTION 07210

SECTION 07241 - EXTERIOR INSULATION AND FINISH SYSTEMS - CLASS PB

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes Class PB exterior insulation and finish system (EIFS) applied over gypsum sheathing.

1.2 PERFORMANCE REQUIREMENTS

- A. Class PB EIFS: Comply with performance characteristics in EIMA's "EIMA Guideline Specification for Exterior Insulation and Finish Systems, Class PB."
 - 1. Impact Resistance: Standard
 - 2. Positive and Negative Wind-Load Performance: Capability to withstand wind loads indicated when tested per ASTM E 330.
- B. Water-/Weather-Resistive-Barrier Coating: Comply with ICBO-ES AC24.

1.3 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, penetrations, terminations, fasteners, and attachments to other work.
- C. Samples: For each EIFS and for each color and texture required.
- D. Field quality-control test reports.
- E. Product certificates
- F. Research/evaluation reports.
- G. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Certified in writing by EIFS manufacturer to install manufacturer's system using trained workers.
- B. Source Limitations: Obtain EIFS through one source from a single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with system components.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups in sizes approximately 48 inches by 48 inches.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Dryvit Systems, Inc.
2. Senergy
3. Parex, Inc.
4. Sto Corp.

2.2 MATERIALS

- A. Compatibility: Provide substrates, adhesive, fasteners, board insulation, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and approved for use by EIFS manufacturer for Project.
- B. Water-/Weather-Resistive-Barrier Coating: Formulation and accessories designed for indicated use.
- C. Primer/Sealer: Substrate conditioner designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation,
- D. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with EIFS manufacturer's requirements, ASTM C 578 for Type I, and EIMA's "EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board."
- E. Base- Coat Materials: Standard Mixture.
- F. Waterproof Adhesive/Base-Coat Materials: Waterproof mixture.
- G. Primer: Factory-mixed elastomeric-polymer primer for preparing base-coat surface for application of finish coat.
- H. Finish-Coat Materials: Standard acrylic-based coating
1. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.
- J. Mechanical Fasteners: Corrosion-resistant fasteners consisting of thermal cap, standard washer and shaft attachments, and fastener suitable for substrate.
- K. Trim Accessories: manufactured from UV-stabilized PVC and complying with ASTM D 1784 and ASTM C 1063.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with ASTM C 1397 and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.
- B. Insulation: Adhesively and mechanically attach to substrate.
- C. Expansion Joints: Install at locations indicated; where required by EIFS manufacturer; where expansion joints are indicated in substrates behind EIFS; where EIFS adjoin dissimilar substrates, materials, and construction; at floor lines in multilevel wood-framed construction; and where wall height changes.
- D. Base Coat: Apply to exposed surfaces of insulation in minimum thickness recommended in writing by EIFS manufacturer, but not less than 1/16-inch dry-coat thickness.
- E. Reinforcing Mesh: Completely embed mesh in wet base coat, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.
- F. Finish Coat: Apply over dry base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

END OF SECTION 07241

SECTION 07531 - EPDM MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes loosely laid and ballasted membrane roofing system.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples: For each product included in membrane roofing system.
- D. Research/evaluation reports.
- E. Maintenance data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.
- C. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Exterior Fire-Test Exposure: Class C; ASTM E 108, for application and roof slopes indicated.

1.4 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

- 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM ROOFING MEMBRANE

- A. EPDM Roofing Membrane: ASTM D 4637, Type I, nonreinforced uniform, flexible sheet made from EPDM, and as follows:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
 - a. Carlisle SynTec Incorporated.
 - b. Firestone Building Products Company.
 - c. GenFlex Roofing Systems.
 - d. Versico Inc.
 - 3. Thickness: 45 mils nominal.
 - 4. Exposed Face Color: Black

2.2 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard bonding adhesive.
- D. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 3-inch- wide minimum, butyl splice tape with release film.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- F. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.3 ROOF INSULATION

- A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
- B. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.4 INSULATION ACCESSORIES

- A. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

PART 3 - EXECUTION

3.1 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

3.2 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

- C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry. Do not apply bonding adhesive to splice area of roofing membrane.
- D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- E. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
- F. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
- G. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

3.3 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

END OF SECTION 07531

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes joint sealants for the following applications:
 - 1. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 2. Exterior joints in horizontal traffic surfaces.
 - 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 4. Interior joints in horizontal traffic surfaces.
- B. See Division 2 Section "Pavement Joint Sealants" for sealing joints in pavements, walkways, and curbing.
- C. See Division 8 Section "Glazing" for glazing sealants.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Compatibility and adhesion test reports.
- C. Product Certificates.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:
 - 1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.5 WARRANTY

- A. **Special Installer's Warranty:** Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

- 1. **Warranty Period:** Two years from date of Substantial Completion.

- B. **Special Manufacturer's Warranty:** Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

- 1. **Warranty Period:** 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Available Products:** Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. **Compatibility:** Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. **VOC Content of Interior Sealants:** Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. **Sealants:** 250 g/L.
 - 2. **Sealant Primers for Nonporous Substrates:** 250 g/L.
 - 3. **Sealant Primers for Porous Substrates:** 775 g/L.
- C. **Colors of Exposed Joint Sealants:** As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

- A. **Elastomeric Sealants:** Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. **Stain-Test-Response Characteristics:** Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated

D. Single-Component Neutral-Curing Silicone Sealant:

1. Products:
 - a. Dow Corning Corporation; 790.
 - b. Tremco; Spectrem 1 (Basic).
 - c. Sonneborn, Division of ChemRex Inc.; Omniseal.
 - d. Tremco; Spectrem 3.
 - e. Dow Corning Corporation; 791.
 - f. Dow Corning Corporation; 795.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 50.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

E. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:

1. Products:
 - a. Tremco; Tremsil 600 White.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

F. Single-Component Nonsag Urethane Sealant:

1. Products:
 - a. Sonneborn, Division of ChemRex Inc.; Ultra.
 - b. Sonneborn, Division of ChemRex Inc.; NP 1.
 - c. Tremco; Vulkem 116.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Uses Related to Exposure: T (traffic) and NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

G. Single-Component Pourable Urethane Sealant:

1. Products:
 - a. Sonneborn, Division of ChemRex Inc.; SL 1.
 - b. Tremco; Vulkem Nova 300 SSL.
2. Type and Grade: S (single component) and P (pourable).
3. Class: 25.
4. Uses Related to Exposure: T (traffic) and NT (nontraffic).

H. Single-Component Pourable Urethane Sealant:

1. Products:
 - a. Tremco; Tremflex S/L.
 - b. Tremco; Vulkem 45.
2. Type and Grade: S (single component) and P (pourable).
3. Class: 25.
4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, [G,]A, and, as applicable to joint substrates indicated, O.

2.5 LATEX JOINT SEALANTS

A. Latex Sealant LS-1: Comply with ASTM C 834, Type O P, Grade NF.

B. Products:

1. Sonneborn, Division of ChemRex Inc.; Sonolac.
2. Tremco; Tremflex 834.

2.6 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C closed-cell material with a surface skin, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

- A. **Primer:** Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. **Cleaners for Nonporous Surfaces:** Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. **Masking Tape:** Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. **Surface Cleaning of Joints:** Clean out joints immediately before installing joint sealants.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.
 - a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
 - 2. Remove laitance and form-release agents from concrete.
 - a. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. **Joint Priming:** Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. **Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- F. Installation of Preformed Silicone-Sealant System: Comply with manufacturer's written instructions.
- G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.
- H. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 07920

SECTION 08111 - STANDARD STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes standard hollow-metal steel doors and frames.

1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, and finishes for each type of steel door and frame specified.
- B. Shop Drawings: Provide a schedule of standard steel doors and frames using same reference numbers for details and openings as those on Drawings.
- C. Product test reports.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amweld Building Products, LLC.
 - 2. Benchmark Doors; a division of General Products Co., Inc.
 - 3. Ceco Door Products; an ASSA ABLOY Group Company.
 - 4. CURRIES Company; an ASSA ABLOY Group Company.
 - 5. Deansteel Manufacturing, Inc.
 - 6. Fleming Door Products Ltd.; an ASSA ABLOY Group Company.
 - 7. Kewanee Corporation (The).
 - 8. Mesker Door Inc.
 - 9. Pioneer Industries, Inc.
 - 10. Republic Builders Products Company.
 - 11. Steelcraft; an Ingersoll-Rand Company.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.
- D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Commercial Steel (CS), Class B coating; mill phosphatized.
- E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.
- F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/A 153M.
- G. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching standard steel door frames of type indicated.
- H. Grout: Comply with Division 4 Section "Unit Masonry Assemblies."
- I. Grout: Comply with ASTM C 476, with a slump of 4 inches for standard steel door frames built into concrete or masonry, as measured according to ASTM C 143/C 143M.
- J. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.
- K. Glazing: Comply with requirements in Division 8 Section "Glazing."

2.3 STANDARD STEEL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces. Comply with ANSI A250.8.
 - 1. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.
 - 2. Vertical Edges for Single-Acting Doors: Square edge
 - 3. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick end closures or channels of same material as face sheets.
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model Full Flush

- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model Full Flush

2.4 STANDARD STEEL FRAMES

- A. General: Comply with ANSI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
1. Fabricate frames with mitered or coped and welded face corners and seamless face joints
 2. Frames for Level 2 Steel Doors: 0.053-inch- thick steel sheet
- C. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.
1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
 2. Frames for Level 2 Steel Doors: 0.053-inch.
 3. Frames for Wood Doors: 0.042-inch.
- D. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.
- E. Jamb Anchors: Masonry, stud-wall, compression, or postinstalled expansion type; not less than 0.042 inch thick.
- F. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick.

2.5 FABRICATION

- A. General: Fabricate standard steel doors and frames to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Standard Steel Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 2. Glazed Lites: Factory cut openings in doors.
- C. Standard Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners, unless otherwise indicated.
 3. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 4. Jamb Anchors: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c.
 5. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.
- D. Hardware Preparation: Factory prepare standard steel doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."
1. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for door and frame preparation for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Provide loose stops and moldings on inside of doors and frames.

2.6 FINISHES

- A. Steel Finish: Factory priming for field-painted finish.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Remove welded-in shipping spreaders installed at factory.
- B. Provide doors and frames of sizes, thicknesses, and designs indicated. Install standard steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- C. Standard Steel Frames: Install standard steel frames for doors and other openings, of size and profile indicated. Comply with SDI 105.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 2. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar as specified in Division 4 Section "Unit Masonry Assemblies."

- D. Standard Steel Doors: Fit hollow-metal doors accurately in frames. Shim as necessary.
- E. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with standard steel door and frame manufacturer's written instructions.
- F. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including standard steel doors or frames that are warped, bowed, or otherwise unacceptable.
- G. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

END OF SECTION 08111

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes solid core doors as follows:
 - 1. Doors with wood-veneer faces and factory finishing.
- B. See Division 8 Section "Glazing" for glass view panels in flush wood doors.

1.2 SUBMITTALS

- A. Product Data: For each type of door. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details; location and extent of hardware blocking; mortises, holes, and cutouts; requirements for veneer matching; factory finishing; fire ratings; and other pertinent data.
- C. Samples: For each face material and finish.

1.3 QUALITY ASSURANCE

- A. Quality Standard: Comply with NWWDA I.S.1-A, "Architectural Wood Flush Doors."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Algoma Hardwoods Inc.
 - 2. VT Industries Inc.
 - 3. Weyerhaeuser Company.

2.2 DOOR CONSTRUCTION

- A. Adhesives: Do not use adhesives containing urea formaldehyde.

- B. Particleboard: Do not use particleboard made with binder containing urea-formaldehyde resin.
- C. Doors for Transparent Finish:
 - 1. Grade: Premium, with Grade A faces
 - 2. Species and Cut: White birch, rotary cut
 - 3. Match between Veneer Leaves: Slip match.
 - 4. Assembly of Veneer Leaves on Door Faces: Center balance, Balance, Running match.
 - 5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
- D. Interior Veneer-Faced Solid-Core Doors:
 - 1. Core: Particleboard
 - 2. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

2.3 FABRICATION

- A. Fabricate doors in sizes indicated for Project-site fitting.
- B. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.
- C. Factory machine doors for hardware that is not surface applied.
 - 1. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Louvers: Factory install louvers in prepared openings.

2.4 FACTORY FINISHING

- A. General: Finish doors at factory
- B. Grade: Premium
- C. Finish: NWWDA I.S.1-A System TR-6 catalyzed polyurethane.
- D. Finish: Manufacturer's standard finish with performance comparable to AWI System TR-6 catalyzed polyurethane
- E. Staining: As selected from manufacturer's full range

F. Effect: Semifilled finish.

G. Sheen: Satin

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
- B. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- C. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 08211

SECTION 08411 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Exterior aluminum-framed storefronts.
 - a. Glazing is retained mechanically with gaskets on four sides
2. Exterior manual-swing aluminum doors.
3. Exterior aluminum door frames.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
4. Dimensional tolerances of building frame and other adjacent construction.
5. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferred to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
 - d. Glazing-to-glazing contact.
 - e. Noise or vibration created by wind and thermal and structural movements.
 - f. Loosening or weakening of fasteners, attachments, and other components.
 - g. Sealant failure.
 - h. Failure of operating units to function properly.

B. Structural-Sealant Joints: Designed to produce tensile or shear stress in structural-sealant joints of less than 20 psi.

C. Structural Loads:

1. Wind Loads: 90 mph

D. Deflection of Framing Members Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

- E. Structural-Test Performance: Systems tested according to ASTM E 330 as follows:
 - 1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 - 3. Test Durations: As required by design wind velocity but not less than 10 seconds.
- F. Temperature Change (Range): Systems accommodate 120 deg F, ambient; 180 deg F, material surfaces.
- G. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of systems of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft.
- H. Water Penetration Under Static Pressure: Systems do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- I. Condensation Resistance: Fixed glazing and framing areas of systems have condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.
- J. Average Thermal Conductance: Fixed glazing and framing areas of systems have average U-factor of not more than 0.69 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- C. Samples: For each exposed finish.
- D. Preconstruction Sealant Test Reports: For structural-sealant-glazed systems.
- E. Product test reports.
- F. Field quality-control test and inspection reports.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** Acceptable to manufacturer and capable of preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. **Testing Agency Qualifications:** An independent agency qualified according to ASTM E 699 for testing indicated.

1.5 WARRANTY

- A. **Special Assembly Warranty:** Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage through fixed glazing and framing areas.
 - f. Failure of operating components to function properly.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. **Special Finish Warranty:** Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1. CMI Architectural Products, Inc.
 - 2. EFCO Corporation.
 - 3. Kawneer.
 - 4. Tubelite Inc.

2.2 MATERIALS

- A. **Aluminum:** Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

F. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 GLAZING SYSTEMS

A. Glazing: As specified in Division 8 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.

- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

2.5 DOORS

- A. Doors: Manufacturer's standard glazed doors, for manual swing operation.
 - 1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior
 - 2. Door Design: Narrow stile; 2-1/8-inch nominal width
 - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.
 - 3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
- B. Door Hardware: As specified in Division 8 Section "Door Hardware."

2.6 DOOR HARDWARE

- A. General: Provide heavy-duty units in sizes and types recommended by entrance system and hardware manufacturers for entrances and uses indicated.
- B. Scheduled Door Hardware: As specified in Section 8: Door Hardware.
 - 1. Named Manufacturer's Products: Product designation and hardware manufacturer are listed in the Door Hardware Schedule at the end of Part 3 to establish minimum requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware.
 - a. Provide named hardware manufacturer's products.
 - b. Named products are basis-of-design products. Provide named hardware manufacturer's products or comparable products that are equivalent in function and quality and that are recommended and supplied by entrance system manufacturer.
- C. Cylinders: As specified in Division 8 Section "Door Hardware."

- D. Cylinder Keying: Master key system. Permanently inscribe each key with a visual key control number and include notation "DO NOT DUPLICATE".
- E. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- F. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- G. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- H. Silencers: BHMA A156.16, Grade 1.

2.7 ACCESSORY MATERIALS

- A. Insulating Materials: As specified in Division 7 Section "Building Insulation."
- B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."
- C. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.8 FABRICATION

- A. Form aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing from framing members.
 - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 6. Provisions for field replacement of glazing from exterior
 - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

- D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).
- E. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
- F. Doors: Reinforce doors as required for installing hardware.
 - 1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- G. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat thermocured system with fluoropolymer topcoats containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Fit joints to produce hairline joints free of burrs and distortion.
 - 2. Rigidly secure nonmovement joints.
 - 3. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
 - 4. Seal joints watertight, unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
 - 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.
- E. Install components plumb and true in alignment with established lines and grades, without warp or rack.
- F. Install glazing as specified in Division 8 Section "Glazing."
 - 1. Structural-Sealant Glazing:
 - a. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
 - b. Install weatherseal sealant according to Division 7 Section "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.
- G. Entrances: Install to produce smooth operation and tight fit at contact points.
 - 1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
 - 2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- H. Install insulation materials as specified in Division 7 Section "Building Insulation."
- I. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.
- J. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
 - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
 - 2. Alignment:
 - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch
 - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch
 - 3. Diagonal Measurements: Limit difference between diagonal measurement to 1/8 inch

3.2 FIELD QUALITY CONTROL

- A. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

- B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 08411

SECTION 08520 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes fixed and operable aluminum-framed windows.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size required by AAMA/WDMA 101/I.S.2/NAFS.
- B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Structural Test:

- 1. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.

- a. Basic Wind Speed: 90 mph
- b. Importance Factor: I
- c. Exposure Category: C

- 2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on testing performed according to AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Deflection Test or structural computations.

- C. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

- 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces

1.3 SUBMITTALS

- A. Product Data: For each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, and installation details

- C. Samples: For each exposed finish.
- D. Product Schedule: Use same designations indicated on Drawings.
- E. Field quality-control test reports.
- F. Product test reports.
- G. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer: A qualified installer, approved by manufacturer to install manufacturer's products.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Failure to meet performance requirements.
- b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
- c. Faulty operation of movable sash and hardware.
- d. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
- e. Failure of insulating glass.

2. Warranty Period:

- a. Window: 5 years from date of Substantial Completion.
- b. Glazing: 5 years from date of Substantial Completion.
- c. Metal Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.2 WINDOW

- A. Window Type: Fixed

- B. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 45
- C. Thermal Transmittance: Provide aluminum windows with a whole-window, U-factor maximum indicated at 15-mph exterior wind velocity and winter condition temperatures when tested according to AAMA 1503
 - 1. U-Factor: 0.43 Btu/sq. ft. x h x deg F
- D. Solar Heat-Gain Coefficient (SHGC): Provide aluminum windows with a whole-window SHGC maximum of 0.40, determined according to NFRC 200 procedures.

2.3 GLAZING

- A. Glass and Glazing Materials: Refer to Division 8 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.
- B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.4 FABRICATION

- A. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.
- B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- C. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- D. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- E. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
- F. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch- thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- G. Glazing Stops: Provide snap-on glazing stops coordinated with Division 8 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.6 ALUMINUM FINISHES

- A. High-Performance Organic Finish: 3-coat, thermocured system with fluoropolymer coats containing not less than 70 percent polyvinylidene fluoride resin by weight, complying with AAMA 2605.

- 1. Color and Gloss: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- F. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- G. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- H. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- I. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08520

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Commercial door hardware.
2. Cylinders for doors specified in other Sections.

B. See Division 8 door sections for astragals and door silencers.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Details of electrified door hardware, including wiring diagrams.

C. Samples: For each exposed finish.

D. Product certificates.

E. Other Action Submittals:

1. Door Hardware Sets: Prepared by or under the supervision of Installer detailing fabrication and assembly of door hardware, as well as procedures and diagrams.

a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.

b. Content: Include the following information:

- 1) Identification number, location, hand, fire rating, and material of each door and frame.
- 2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
- 3) Complete designations of every item required for each door or opening including name and manufacturer.
- 4) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

2. Keying Schedule: Prepared by or under the supervision of Installer detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.

1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252
- C. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.5 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 years from date of Substantial Completion

- a. Exit Devices: Two years from date of Substantial Completion.
- b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in door and frame schedule
 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:

1. **Named Manufacturers' Products:** Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Sets" Article.
2. **References to BHMA Standards:** Provide products complying with these standards and requirements for description, quality, and function.

2.2 HINGES, GENERAL

- A. **Template Requirements:** Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. **Hinge Base Metal:** Unless otherwise indicated, provide the following:
 1. **Exterior Hinges:** Stainless steel, with stainless-steel pin
 2. **Interior Hinges:** Stainless steel, with stainless-steel pin
 3. **Hinges for Fire-Rated Assemblies:** Stainless steel, with stainless-steel pin
- C. **Nonremovable Pins:** Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors
- D. **Fasteners:** Comply with the following:
 1. **Machine Screws:** For metal doors and frames. Install into drilled and tapped holes.
 2. **Wood Screws:** For wood doors and frames.
 3. **Threaded-to-the-Head Wood Screws:** For fire-rated wood doors.
 4. **Screws:** Phillips flat-head; machine screws (drilled and tapped holes) for metal doors, wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 HINGES

- A. **Butts and Hinges:** BHMA A156.1.
- B. **Template Hinge Dimensions:** BHMA A156.7.
- C. **Manufacturers:**
 1. **Hager Companies (HAG).**
 2. **Stanley Commercial Hardware; Div. of The Stanley Works (STH).**

2.4 SPRING HINGES

- A. **Self-Closing Hinges:** BHMA A156.17.
- B. **Manufacturers:**
 1. **Hager Companies (HAG).**
 2. **Stanley Commercial Hardware; Div. of The Stanley Works (STH).**

2.5 LOCKS AND LATCHES, GENERAL

- A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- C. Electrified Locking Devices: BHMA A156.25.
- D. Lock Trim:
 - 1. Levers: Schlage; Saturn
 - 2. Dummy Trim: Match lever lock trim and escutcheons.
- E. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
- F. Backset: 2-3/4 inches, unless otherwise indicated.
- G. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

2.6 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 - 1. Bored Locks: BHMA A156.2.
- B. Bored Locks: BHMA A156.2, Grade 1 Series 4000.
 - 1. Manufacturers:
 - a. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.7 AUXILIARY LOCKS AND LATCHES

- A. Auxiliary Locks: BHMA A156.5, Grade 1
 - 1. Manufacturers:
 - a. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.8 DOOR BOLTS

- A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
- B. Dustproof Strikes: BHMA A156.16, Grade 1.

C. Surface Bolts: BHMA A156.16, Grade 1

1. Flush Bolt Heads: Minimum of 1/2-inch- diameter rods of brass, bronze, or stainless steel with minimum 12-inch- long rod for doors up to 84 inches in height. Provide longer rods as necessary for doors exceeding 84 inches
2. Manufacturers:
 - a. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - b. Hager Companies (HAG).
 - c. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - d. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
 - e. Trimco (TBM).

D. Manual Flush Bolts: BHMA A156.16, Grade 1 designed for mortising into door edge.

1. Manufacturers:

- a. Adams Rite Manufacturing Co. (ARM).
- b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
- c. Hager Companies (HAG).
- d. Hiawatha, Inc. (HIA).
- e. IVES Hardware; an Ingersoll-Rand Company (IVS).
- f. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
- g. Trimco (TBM).

2.9 EXIT DEVICES

A. Exit Devices: BHMA A156.3, Grade 1

B. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf

C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

F. Removable Mullions: BHMA A156.3.

G. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.

- H. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 - 1. Operation: Movable
- I. Outside Trim: Lever with cylinder, material and finish to match locksets, unless otherwise indicated.
 - 1. Match design for locksets and latchsets, unless otherwise indicated.
- J. Manufacturers:
 - 1. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - 2. Von Duprin; an Ingersoll-Rand Company (VD).
 - 3. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.10 LOCK CYLINDERS

- A. Standard Lock Cylinders: BHMA A156.5, Grade 1
- B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: Six
 - 2. High-Security Grade: BHMA A156.5, Grade 1A, listed and labeled as complying with pick- and drill-resistant testing requirements in UL 437 (Suffix A).
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; with removable cores.
- E. Construction Keying: Comply with the following:
 - 1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
 - 2. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
 - a. Furnish permanent cores to Owner for installation.
- F. Manufacturer: Same manufacturer as for locks and latches.
- G. Manufacturers:
 - 1. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.11 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference into master key system.
- B. Keys: Nickel silver, permanently inscribed with a visual key control number and including the notation "DO NOT DUPLICATE."

1. Quantity: In addition to one extra key blank for each lock, provide three cylinder change keys and five master keys.

2.12 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5, Grade wall-mounted metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
- B. Cross-Index System: Single index system for recording key information. Include three receipt forms for each key-holding hook.

2.13 CLOSERS

- A. Accessibility Requirements: Comply with the following maximum opening-force requirements:
 1. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 2. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
 3. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
- C. Hold-Open Closers/Detectors: Coordinate and interface integral smoke detector and closer device with fire alarm system.
- D. Flush Floor Plates: Provide finish cover plates for floor closers unless thresholds are indicated. Match door hardware finish, unless otherwise indicated.
- E. Recessed Floor Plates: Provide recessed floor plates with insert of floor finish material for floor closers unless thresholds are indicated. Provide extended closer spindle to accommodate thickness of floor finish.
- F. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- G. Surface Closers: BHMA A156.4, Grade 1, Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
 1. Manufacturers:
 - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company (CR).
 - b. LCN Closers; an Ingersoll-Rand Company (LCN).
 - c. Norton Door Controls; an ASSA ABLOY Group company (NDC).

- d. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.14 STOPS AND HOLDERS

- A. Stops and Bumpers: BHMA A156.16, Grade 1
 - 1. Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.
- B. Silencers for Door Frames: BHMA A156.16, Grade 1; neoprene or rubber; fabricated for drilled-in application to frame.
- C. Manufacturers:
 - 1. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
 - 2. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - 3. Hager Companies (HAG).
 - 4. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
 - 5. Trimco (TBM).

2.15 DOOR GASKETING

- A. Standard: BHMA A156.22.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
- D. Gasketing Materials: ASTM D 2000 and AAMA 701/702.
- E. Manufacturers:
 - 1. Hager Companies (HAG).
 - 2. Pemko Manufacturing Co. (PEM).
 - 3. Reese Enterprises (RE).

2.16 THRESHOLDS

- A. Standard: BHMA A156.21.
- B. Accessibility Requirements: Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high
- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.
- D. Manufacturers:
 - 1. Hager Companies (HAG).
 - 2. Pemko Manufacturing Co. (PEM).
 - 3. Reese Enterprises (RE).

2.17 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Comply with NFPA 80 for fasteners of door hardware in fire-rated applications.
- C. Finishes: BHMA A156.18, as indicated in door hardware sets.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.
- C. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface

protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- E. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- G. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

3.2 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

END OF SECTION 08710

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Glazed curtain walls.
4. Glazed entrances.
5. Interior borrowed lites.
6. Storefront framing.

1.2 DEFINITIONS

- A. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.
- B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.
- C. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
- D. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour at 33 feet above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
 - 1) Basic Wind Speed: 90 mph
 - 2) Importance Factor: I
 - 3) Exposure Category: C
 - C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
 - D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
 1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite 6.0 mm thick and a nominal 1/2-inch- wide interspace.
 4. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
 - a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F
 - b. Solar Heat Gain Coefficient: NFRC 200.
 - c. Solar Optical Properties: NFRC 300.

1.4 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Samples: 12-inch- square, for each type of glass product indicated, other than monolithic clear float glass.
- C. Glazing Schedule: Use same designations indicated on Drawings.

- D. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer.

1.5 QUALITY ASSURANCE

- A. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201
- B. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council

1.6 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include.

2.2 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
 1. Ultra-Clear (Low-Iron) Float Glass: Class I (clear); with a minimum 91 percent visible light transmission and a minimum solar heat gain coefficient of 0.87.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
 3. For uncoated glass, comply with requirements for Condition A.
 4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
 5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

2.3 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
 1. Neoprene, ASTM C 864.
 2. EPDM, ASTM C 864.
 3. Silicone, ASTM C 1115.
 4. Thermoplastic polyolefin rubber, ASTM C 1115.
 5. Any material indicated above.

2.4 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
 1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As indicated by manufacturer's designations
- B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
1. Type 1, for glazing applications in which tape acts as the primary sealant.
 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.8 INSULATING-GLASS UNITS

- A. Reflective and Low-E Insulating-Glass Units:

1. Overall Unit Thickness and Thickness of Each Lite: 25 and 6.0 mm
2. Interspace Content: Argon
3. Outdoor Lite: Class 2 float glass.
4. Low-E Coating: Pyrolytic on third surface.
5. Indoor Lite: Class 1 (clear) float glass.
6. Visible Light Transmittance: 40
7. Winter Nighttime U-Factor: .31
8. Summer Daytime U-Factor: .32
9. Solar Heat Gain Coefficient: .40
10. Outdoor Visible Reflectance: .34

PART 3 - EXECUTION

3.1 GLAZING

- A. General: Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
 1. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
 2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
 3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

4. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
 5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
 6. Provide spacers for glass lites where length plus width is larger than 50 inches.
 7. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- B. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
1. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
 2. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
 3. Apply heel bead of elastomeric sealant.
 4. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
 5. Apply cap bead of elastomeric sealant over exposed edge of tape.
- C. Gasket Glazing (Dry): Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
1. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
 2. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
 3. Install gaskets so they protrude past face of glazing stops.

3.2 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
- B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 08800

SECTION 09250 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Interior gypsum board.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.3 QUALITY ASSURANCE

- A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

- a. Each texture finish indicated.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. American Gypsum Co.

- b. National Gypsum Company.
- c. USG Corporation.

B. Regular Type:

- 1. Thickness: 5/8 inch
- 2. Long Edges: Tapered

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

- 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
- 2. Shapes: as required.

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

- 1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

- 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
- 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
- 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
- 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

- 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
- E. Vapor Retarder: As specified in Division 7 Section "Building Insulation."

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

3.2 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Regular Type: As indicated on Drawings

3.3 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners
 - 2. LC-Bead: Use at exposed panel edges
 - 3. L-Bead: As required
 - 4. U-Bead: As required

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile
 - 3. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated
 - a. Primer and its application to surfaces are specified in other Division 9 Sections.

3.8 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09250

SECTION 09310 - CERAMIC TILE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Ceramic tile.
2. Glazed wall tile.
3. Metal edge strips installed as part of tile installations.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints.

C. Samples:

1. Each type, composition, color, and finish of tile.
2. Assembled samples with grouted joints for each type, composition, color, and finish of tile.
3. Stone thresholds in 6-inch lengths.

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 TILE PRODUCTS

- A. CT-1: Factory-mounted flat tile as follows:

TileXDesign, 13"x13" porcelain tile, Dom Khadi DOKOI1313G, color; oil.

- B. CT-2: Factory-mounted flat tile as follows:

TileXDesign, 13"x13" porcelain tile, Dom Khadi DOKOWH1313G, color; white.

- C. CT-3: Flat tile as follows:

American Olian, 8"x8" unglazed porcelain tile, Terra Paver, color; W77 Naturale

2.3 ACCESSORY MATERIALS

- A. Thresholds: Fabricate to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.

2.4 SETTING AND GROUTING MATERIALS

- A. Manufacturers:

1. Atlas Minerals & Chemicals, Inc.
2. Boiardi Products Corporation.
3. Bonsal, W. R., Company.
4. Bostik.
5. C-Cure.
6. Custom Building Products.
7. DAP, Inc.
8. Jamo Inc.
9. LATICRETE International Inc.
10. MAPEI Corporation.
11. Southern Grouts & Mortars, Inc.
12. Summitville Tiles, Inc.
13. TEC Specialty Products Inc.

- B. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

1. For wall applications, provide nonsagging mortar.

- C. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3
- D. Standard Sanded Cement Grout: ANSI A118.6, color as indicated.
- E. Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.

2.5 MISCELLANEOUS MATERIALS

- A. Elastomeric Sealants: Elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."
 - 1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. One-Part, Mildew-Resistant Silicone: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for in-service exposures of high humidity and extreme temperatures.
 - a. Products:
 - 1) Dow Corning Corporation; Dow Corning 786.
 - 2) GE Silicones; Sanitary 1700.
 - 3) Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - 4) Tremco, Inc.; Tremsil 600 White.
- C. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials.
- D. Metal Edge Strips: Angle or L-shape, nickel silver exposed-edge material.
- E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions.
- C. Remove protrusions, bumps, and ridges by sanding or grinding.
- D. Blending: For tile exhibiting color variations, use factory blended tile or blend tiles at Project site before installing.

- E. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.2 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Grind cut edges of tile abutting trim, finish, or built-in items. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
 - 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."
- H. Grout tile to comply with requirements of ANSI A108.10, unless otherwise indicated.
- I. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
 - 1. Exterior tile floors.
 - 2. Tile floors in wet areas.
 - 3. Tile swimming pool decks.
 - 4. Tile floors in laundries.
 - 5. Tile floors composed of tiles 8 by 8 inches or larger.
 - 6. Tile floors composed of rib-backed tiles.
- J. Install tile on floors with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/16 inch

- K. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
- L. Install metal lath and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.
- M. Install tile on walls with the following joint widths:
 - 1. Glazed Wall Tile: 1/16 inch
- N. Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.3 FLOOR TILE INSTALLATION SCHEDULE

- A. Interior floor installation on concrete; thin-set mortar; TCA F113.
 - 1. Thin-Set Mortar: Dry-set portland cement mortar.
 - 2. Grout: Standard unsanded cement grout.

3.4 WALL TILE INSTALLATION SCHEDULE

- A. Interior wall installation over masonry or concrete; cement mortar bed (thickset); TCA W201.
- B. Interior wall installation over gypsum board on metal studs; organic adhesive; TCA W242.
 - 1. Grout: Polymer-modified unsanded grout.

END OF SECTION 09310

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each exposed finish.
- C. Product test reports.

1.3 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory or an NVLAP-accredited laboratory.
- B. Fire-Test-Response Characteristics:
 - 1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Surface-Burning Characteristics: Acoustical panels complying with ASTM E 1264 for Class C materials, when tested per ASTM E 84.
 - a. Smoke-Developed Index: 450 or less.
- C. Seismic Standard: Comply with the following:
 - 1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.
 - 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANEL CEILINGS, GENERAL

- A. Acoustical Panel Standard: Comply with ASTM E 1264.
- B. Metal Suspension System Standard: Comply with ASTM C 635.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- D. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 1. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.
- E. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING ACT-1

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: provide one of the following:
 - 1. USG Interiors, Inc.; Frost
- C. Color: White
- D. Edge/Joint Detail: Reveal sized to fit flange of exposed suspension system members
- E. Thickness: 3/4 inch
- F. Modular Size: 24 by 24 inches

2.3 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING ACT-2

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: provide one of the following:
 - 1. USG Interiors, Inc.; Gypsum Lay-in Panels ClimaPlus
- C. Color: White
- D. Edge/Joint Detail: Square edge
- E. Thickness: 3/4 inch
- F. Modular Size: 24 by 24 inches

2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Products: provide the following:
 - 1. USG Interiors, Inc.
- B. Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - 3. Cap Material: Steel or aluminum cold-rolled sheet
 - 4. Cap Finish: Painted white

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders.
- C. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers, use trapezes or equivalent devices. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

1. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete slabs.
 2. Do not attach hangers to steel deck tabs
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

END OF SECTION 09511

SECTION 09651 - RESILIENT FLOOR TILE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Solid vinyl floor tile.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: Full-size units of each color and pattern of resilient floor tile required.
- C. LEED Submittals:
1. Credit EQ 4.1: Manufacturers' product data for adhesives, including printed statement of VOC content.

1.3 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. After post installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install resilient products after other finishing operations, including painting, have been completed.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 SOLID VINYL FLOOR TILE VL-1

- A. Centiva, 4"x36" planks, Good Ole Woods HYGW40-E, color; Chocolate Pecan

3.2 INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

- B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain running in one direction.

- C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

- D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

- E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

- F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

- G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

- H. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

- a. Do not wash surfaces until after time period recommended by manufacturer.

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- I. Protect resilient products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION 09651

SECTION 09653 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

1. Wall base.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.3 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F in spaces to receive floor tile during the following time periods:
1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 COLORS AND PATTERNS

- A. Colors and Patterns: As selected from manufacturer's full range

2.3 RESILIENT WALL BASE

- A. Wall Base: ASTM F 1861.

1. AFCO-USA, American Floor Products Company, Inc
2. Armstrong World Industries, Inc.
3. Azrock Commercial Flooring, DOMCO
4. Burke Mercer Flooring Products
5. Endura
6. Estrie, American Biltrite (Canada) Ltd.
7. Johnsonite
8. Marley Flexco (USA), Inc.
9. Mondo Rubber International, Inc.
10. Musson, R. C. Rubber Co.
11. Nora Rubber Flooring, Freudenberg Building Systems, Inc.
12. Pirelli Rubber Flooring
13. Roppe Corporation
14. Stoler Industries
15. VPI, LLC, Floor Products Division

- B. Type (Material Requirement): TV (vinyl)

- C. Group (Manufacturing Method): I (solid, homogeneous) or II (layered)

- D. Style: Cove (with top-set toe)

- E. Minimum Thickness: 0.125 inch

- F. Height: 2-1/2 inches, 4 inches

- G. Lengths: Coils in manufacturer's standard length

- H. Outside Corners: Premolded

- I. Inside Corners: Job formed

- J. Surface: Smooth.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturers for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Cove Base Adhesives: 50 g/L.
 - b. Rubber Floor Adhesives: 60 g/L.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- C. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- D. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.

- E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
- F. Premolded Corners: Install premolded corners before installing straight pieces.
- G. Job-Formed Corners:
 - 1. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.3 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - a. Do not wash surfaces until after time period recommended by manufacturer.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION 09653

SECTION 09680 - CARPET

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes tufted carpet

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: For each color and texture required.
 - 1. Carpet: 12-inch-square Sample.
 - 2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch-long Samples.
- C. Product Schedule: For carpet Use same designations indicated on Drawings.
- D. Maintenance data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

1.5 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

1.6 WARRANTY

- A. Special Warranty for Carpet: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, and delamination.

1. Warranty Period: 10 years from date of Substantial Completion.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

PART 2 - PRODUCTS

2.1.1 CARPET

- A. CPT-1 Shaw Contract, 24"x24" tiles, Montage Collection, Echo 59427, color; effervescence 24330
- B. CPT-2 Shaw Contract, 24"x24" tiles, Montage Collection, Etch 59424, color; effervescence 24330

2.1.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and patching Compounds: Latex modified, hydraulic- cement-based formulation provided or recommended by carpet manufacturer.
- B. Adhesives: water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
 1. VOC Limits: Provide adhesives that comply with the following limits for VOC content when tested according to ASTM D 5116.
 - a. Total VOC's: 10mg/ sq m x h
 - b. Formaldehyde: 0.05 mg/ sq m x h
 - c. 2-Ethyl-1-Hexanol: 3.00 mg/sq m x h

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."

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- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- D. Install pattern parallel to walls and borders.

END OF SECTION 09680

SECTION 09912 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Exposed metal structure
2. Gypsum board.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.
- C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

- A. MPI Standards:
1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
1. Quantity: Furnish an additional 5 percent, but not less than [gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

- A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop:
1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 2. Nonflat Paints and Coatings: VOC content of not more than 150 g/L.
 3. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 4. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
- C. Colors: selected by Architect from manufacturer's full range

2.2 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: MPI #50.
1. VOC Content: E Range of E1
 2. Environmental Performance Rating: EPR 1
- B. Interior Alkyd Primer/Sealer: MPI #45.

1. VOC Content: E Range of E1.

2.4 METAL PRIMERS

- A. Quick-Drying Alkyd Metal Primer: MPI #76.

1. VOC Content: E Range of E1.

2.5 LATEX PAINTS

- A. Interior Latex (Flat): MPI #53 (Gloss Level 1).

1. VOC Content: E Range of E1
2. Environmental Performance Rating: EPR 0.5

- B. Interior Latex (Low Sheen): MPI #44 (Gloss Level 2).

1. VOC Content: E Range of E1
2. Environmental Performance Rating: EPR 1

- C. Interior Latex (Eggshell): MPI #52 (Gloss Level 3).

1. VOC Content: E Range of E1
2. Environmental Performance Rating: EPR 1

- D. Interior Latex (Satin): MPI #43 (Gloss Level 4).

1. VOC Content: E Range of E1
2. Environmental Performance Rating: EPR 1.5

- E. Interior Latex (Semigloss): MPI #54 (Gloss Level 5).

1. VOC Content: E Range of E1
2. Environmental Performance Rating: EPR 2

- F. Interior Latex (Gloss): MPI #114 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).

1. VOC Content: E Range of E1
2. Environmental Performance Rating: EPR 2

2.6 ALKYD PAINTS

- A. Interior Alkyd (Flat): MPI #49 (Gloss Level 1).

1. VOC Content: E Range of E1

- B. Interior Alkyd (Eggshell): MPI #51 (Gloss Level 3).

1. VOC Content: E Range of E1

C. Interior Alkyd (Semigloss): MPI #47 (Gloss Level 5).

1. VOC Content: E Range of E1
2. Environmental Performance Rating: EPR 1

D. Interior Alkyd (Gloss): MPI #48 (Gloss Level 6).

1. VOC Content: E Range of E1

2.7 QUICK-DRYING ENAMELS

A. Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).

1. VOC Content: E Range of E1

B. Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).

1. VOC Content: E Range of E1

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
 5. Plaster: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
 - 1. Mechanical Work:
 - a. Pipe hangers and supports.
 - e. Visible portions of surfaces of metal ducts
 - f. Duct, equipment, and metal piping
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - 2. Electrical Work:
 - a. Exposed conduit
- E. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces

3.3 INTERIOR PAINTING SCHEDULE

- A. PT-1; Benjamin Moore, HC-81 Manchester Tan
- B. PT-2; Benjamin Moore, HC-79 Greenbrier Beige
- C. PT-3; Benjamin Moore, HC-76 Davenport Tan
- D. PT-4; Benjamin Moore, HC-145 Van Courtland Blue
- E. PT-5; Benjamin Moore, 1000 Northwood Brown, all metal door frames

END OF SECTION 09912

SECTION 09931 - WOOD STAINS AND TRANSPARENT FINISHES
PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and the application of wood finishes on the following substrates:

1. Interior Substrates:

- a. Dressed lumber (finish carpentry).

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.
- C. Product List: Printout of MPI's current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.

1.3 QUALITY ASSURANCE

- A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in its "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and finish systems indicated.

1.4 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Material Compatibility:

1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

B. Stain Colors: As selected by Architect from manufacturer's full range

2.2 PRIMERS AND SEALERS

A. Lacquer Sanding Sealer: MPI #84.

1. VOC Content: E Range of E1

2.3 STAINS

A. Interior Wood Stain (Semitransparent): MPI #90.

1. VOC Content: E Range of E1

2.4 LACQUERS

A. Lacquer (Clear Flat): MPI #87, Gloss Level 1.

1. VOC Content: E Range of E1

B. Lacquer (Clear Satin): MPI #85, Gloss Level 4.

1. VOC Content: E Range of E1

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
1. Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
 3. Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.
 4. Beginning application of finish system constitutes Contractor's acceptance of substrate and conditions.

3.2 PREPARATION AND APPLICATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.3 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Finish Carpentry Substrates:

- 1. Lacquer Over Stain and Sealer System: MPI INT 6.3F.
 - a. Stain Coat: Interior wood stain (semitransparent).
 - b. Seal Coat: Lacquer sanding sealer.
 - c. Two Finish Coats

B. Exposed Wood Panel-Product Substrates:

- 1. Lacquer Over Stain and Sealer System: MPI INT 6.4F.
 - a. Stain Coat: Interior wood stain (semitransparent).
 - b. Seal Coat: Lacquer sanding sealer.
 - c. Two Finish Coats. Lacquer.

END OF SECTION 09931

SECTION 10431 - SIGNS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Panel signs.
 - 2. Dimensional characters (letters and numbers) for exterior use.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, wiring diagrams, and attachments to other Work.
 - 1. Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 2. Provide message list for each sign, including large-scale details of wording, lettering, and braille layout.
- C. Samples: For each sign material indicated that involves color selection.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PANEL SIGNS

- A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Available Manufacturers:
 - 1. Allenite Signs; Allen Marking Products, Inc.
 - 2. American Graphics Inc.
 - 3. Andco Industries Corp.
 - 4. APCO Graphics, Inc.
 - 5. ASI Sign Systems, Inc.
 - 6. Best Manufacturing Co.
 - 7. Grimco, Inc.
 - 8. Innerface Sign Systems, Inc.
 - 9. Kaltech Industries Group, Inc.
 - 10. Mills Manufacturing, Inc.
 - 11. Mohawk Sign Systems.
 - 12. Seton Identification Products.
 - 13. Signature Signs, Inc.
 - 14. Supersine Company (The).
- C. Cast-Acrylic Sheet: Manufacturer's standard and as follows:
 - 1. Color As selected from manufacturer's full range
- D. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:
 - 1. Edge Condition: Square cut
 - 2. Corner Condition: Square
- E. Laminated Panels: Permanently laminate face panels to backing sheets of material; use manufacturer's standard process.
- F. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.
 - 1. Panel Material: Opaque acrylic sheet
 - 2. Raised-Copy Thickness: Not less than 1/32 inch.
- G. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphic devices into panel sign on face indicated to produce precisely formed copy, incised to uniform depth.
 - 1. Engraved Opaque Acrylic Sheet: Fill engraved copy with enamel.

2.3 DIMENSIONAL CHARACTERS

- A. Available Manufacturers:
 - 1. American Graphics Inc.

2. A.R.K. Ramos.
3. ASI Sign Systems, Inc.
4. Charleston Industries, Inc.
5. Gemini Incorporated.
6. Grimco, Inc.
7. Innerface Sign Systems, Inc.
8. Kaltech Industries Group, Inc.
9. Metal Arts; Div. of L&H Mfg.
10. Mills Manufacturing, Inc.
11. Mohawk Sign Systems.
12. Signature Sign Signs, Inc.
13. Southwell Co. (The).

B. **Cutout Characters:** Cut characters from solid plate of thickness and metal indicated. Produce precisely cut characters with square cut, smooth edges. Comply with requirements indicated for finish, style, and size.

1. **Metal:** Aluminum

C. **Fabricated Characters:** Fabricate letters and numbers to required sizes and styles, using metals and thicknesses indicated. Form exposed faces and sides of characters to produce surfaces free from warp and distortion. Include internal bracing for stability and attachment of mounting accessories. Comply with requirements indicated for finish, style, and size.

1. **Aluminum Sheet:** Not less than 0.090 inch thick.
2. **Character Height:** As indicated
3. **Character Style:** Times Roman

2.4 ACCESSORIES

- A. **Mounting Methods:** Use double-sided vinyl tape fabricated from materials that are not corrosive to sign material and mounting surface.
- B. **Anchors and Inserts:** Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.5 ALUMINUM FINISHES

- A. **Clear Anodic Finish:** Manufacturer's standard clear anodic coating, 0.018 mm or thicker, over a satin (directionally textured) mechanical finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
 - 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using methods indicated below:
 - 1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
- C. Dimensional Characters: Mount characters using standard fastening methods recommended in writing by manufacturer for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.
 - 1. Projected Mounting: Mount characters at projection distance from wall surface indicated.

END OF SECTION 10431

SECTION 10520 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Portable fire extinguishers.
2. Fire-protection cabinets.
3. Mounting brackets for fire extinguishers.
4. Owner-Furnished Material: Fire extinguishers.

B. See Division 9 painting Sections for field painting fire-protection cabinets.

C. See Division 13 Section "Fire-Suppression Piping" for hose systems, racks, and valves.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Fire Extinguishers: Include rating and classification.

B. Maintenance data.

1.3 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Failure of hydrostatic test according to NFPA 10.
- b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 PORTABLE FIRE EXTINGUISHERS

- A. Available Manufacturers:

1. Amerex Corporation.
2. Ansul Incorporated.
3. Badger Fire Protection.
4. Buckeye Fire Equipment Company.
5. Fire End & Croker Corporation.
6. General Fire Extinguisher Corporation.
7. JL Industries, Inc.
8. Kidde Fymetics.
9. Larsen's Manufacturing Company.
10. Modern Metal Products; Div. of Technico.
11. Moon American.
12. Potter Roemer; Div. of Smith Industries, Inc.
13. Watrous; Div. of American Specialties, Inc.

- B. General: Provide fire extinguishers of type, size, and capacity for each mounting bracket indicated.

1. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B

- C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3-A:40-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

- A. Available Manufacturers:

1. Amerex Corporation.
2. Ansul Incorporated.
3. Badger Fire Protection.
4. Buckeye Fire Equipment Company.
5. Fire End & Croker Corporation.
6. General Fire Extinguisher Corporation.

7. JL Industries, Inc.
 8. Larsen's Manufacturing Company.
 9. Potter Roemer; Div. of Smith Industries, Inc.
- B. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
1. Color: Red.
- C. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective, or undercharged units.
- B. Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10520

SECTION 10801 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Toilet Tissue Dispenser
2. Liquid Soap Dispenser
3. Grab Bars
4. Surface Mounted Hand Dryers
5. Napkin Disposals
6. Mirrors

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule:

1. Identify locations using room designations indicated on Drawings.
2. Identify products using designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Toilet Tissue (Roll) Dispenser TPD

1. Surface Mounted Rual Roll Toilet Tissue Dispenser shall be Bradley Model 5402 or approved equal.

C. Liquid-Soap Dispenser LSD

1. Lavatory Mounted Liquid Soap Dispenser shall be Bradley Model 6332 or approved equal.

D. Grab Bar GB-1, GB-2, GB-3

1. Grab Bars shall be Bradley Model 812 or approved equal.
 - a. GB-1, 42"
 - b. GB-2, 36"

c. GB-3, 18"

E. Hand Dryers HD

1. Surface Mounted Hand Dryer to be Bradley Model 2880-28, stainless steel, or approved equal.

F. Napkin Disposals ND

1. Surface Mounted Napkin Disposal shall be Bradley Model 4722-15 or approved equal.

F. Mirrors MR

1. Framed Mirrors shall be Bradley Model 780-24"x36" or approved equal.

2.2 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

END OF SECTION 10801

SECTION 13125 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes metal building systems that consist of integrated sets of mutually dependent components including structural framing, roof panels and accessories.
- B. See Division 3 Section "Cast-in-Place Concrete" for concrete foundations, slabs, and anchor-bolt installation.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Engineer metal building systems according to procedures in MBMA's "Metal Building Systems Manual."
 - 2. Design Loads: As indicated on Drawings.
- C. Thermal Movements: Provide metal panel systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.3 SUBMITTALS

- A. Product Data: For each type of metal building system component indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Anchor-Bolt Plans: Submit anchor-bolt plans before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.
 - 3. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
 - 4. Metal Roof Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.

- C. Samples: For each type of building component and for each color and texture required.
- D. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
 - 1. Name and location of Project.
 - 2. Order number.
 - 3. Name of manufacturer.
 - 4. Name of Contractor.
 - 5. Building dimensions including width, length, height, and roof slope.
 - 6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
 - 7. Governing building code and year of edition.
 - 8. Design loads and load combinations.
 - 9. Building-use category.
 - 10. AISC Certification for Category MB: Include statement that metal building system and components were designed and produced in an AISC-Certified Facility by an AISC-Certified Manufacturer.
- E. Welding certificates.
- F. Erector Certificate: Signed by manufacturer certifying that erector complies with requirements.
- G. Manufacturer certificate.
- H. Surveys: Show final elevations and locations of major members. Have surveyor who performed surveys certify their accuracy.

1.4 QUALITY ASSURANCE

- A. Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- B. Manufacturer Qualifications: A qualified manufacturer.
 - 1. AISC Certification for Category MB: An AISC-Certified Manufacturer that designs and produces metal building systems and components in an AISC-Certified Facility.
 - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. Structural Steel: Comply with AISC's "Specification for Structural Steel Buildings--Allowable Stress Design, Plastic Design," or AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings," for design requirements and allowable stresses.

- E. Cold-Formed Steel: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members," or AISI's "Load and Resistance Factor Design Specification for Steel Structural Members," for design requirements and allowable stresses.
- F. Pre-Erection Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to metal building systems including, but not limited to, the following:
 - 1. Inspect and discuss condition of foundations and other preparatory work performed by other trades.
 - 2. Review structural load limitations.
 - 3. Review required testing, inspecting, and certifying procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness and with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.6 PROJECT CONDITIONS

- A. Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."
- B. Coordinate installation of roof penetrations, which are specified in Division 7 Section "Roof Accessories."

1.8 WARRANTY

- A. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Siliconized Polyester Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 15 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 2 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
3. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Behlen Mfg. Co.
 2. Butler Manufacturing Company.
 3. Ceco Building Systems; Division of Robertson-Ceco Corporation.
 4. Metallic Metal Building Company; Division of NCI Building Systems, LLP.
 5. VP Buildings, Inc.; a United Dominion Company.

2.2 STRUCTURAL-FRAMING MATERIALS

- A. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
- B. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
- C. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
- D. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
- E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
- F. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55 (205 through 380), or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480); or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80 (170 through 550), or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480).

- G. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550) or High-Strength Low Alloy Steel (HSLAS), Grades 50 through 80 (340 through 550); with G60 (Z180) coating designation; mill phosphatized.
- H. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550) or High-Strength Low Alloy Steel (HSLAS), Grades 50 through 80 (340 through 550); with G90 (Z275) coating designation.
 - 2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 50 or 80; with Class AZ50 coating.
- I. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts; ASTM A 563 (ASTM A 563M) carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
- J. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
- K. High-Strength Bolts, Nuts, and Washers: ASTM A 490 Type 1, heavy hex steel structural bolts[or tension-control, bolt-nut-washer assemblies with splined ends]; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain.
- L. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
 - 1. Configuration: Straight.
 - 2. Nuts: ASTM A 563 (ASTM A 563M) [heavy] hex carbon steel.
 - 3. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 4. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
- M. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
 - 1. Nuts: ASTM A 563 (ASTM A 563M) [heavy] hex carbon steel.
 - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 3. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
- N. Threaded Rods: ASTM A 193/A 193M.
 - 1. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
 - 2. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
- O. Primer: SSPC-Paint 15, Type I, red oxide.

2.3 MATERIALS FOR FIELD-ASSEMBLED METAL PANELS

- A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80, with G90 coating designation.
 - 2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 50 or 80; with Class AZ50 coating designation.
 - 3. Surface: Smooth, flat finish.

2.4 THERMAL INSULATION

- A. Metal Building Insulation: ASTM C 991, Type I, or NAIMA 202 glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch-wide, continuous, vapor-tight edge tabs; and with a flame-spread index of 25 or less.
- B. Mineral-Fiber-Blanket Insulation: ASTM C 665, type indicated below; consisting of fibers manufactured from glass.
 - 1. Type: I blankets without membrane covering.
- C. Vapor-Retarder: ASTM C 1136, with permeance not greater than 0.02 perm when tested according to ASTM E 96, Desiccant Method.
 - 1. Composition: Reinforced polypropylene film, White
- D. Retainer Strips: 0.019-inch-thick, formed, galvanized steel or PVC retainer clips colored to match insulation facing.
- E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.5 MISCELLANEOUS MATERIALS

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
 - 1. Fasteners for Metal Roof Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM or neoprene sealing washer.
- B. Metal Panel Sealants:
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing.
 - 2. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane, polysulfide, or silicone-rubber sealant.

2.7 FABRICATION, GENERAL

- A. Tolerances: Comply with MBMA's "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."
- B. Metal Panels: Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.8 STRUCTURAL FRAMING

A. General:

- 1. Primary Framing: Shop fabricate framing components to indicated size and section with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
 - a. Make shop connections by welding or by using high-strength bolts.
 - b. Join flanges to webs of built-up members by a continuous submerged arc-welding process.
 - c. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
 - d. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary structural members with specified primer after fabrication.
- 2. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
 - a. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary structural members with specified primer after fabrication.

B. Primary Framing: Manufacturer's standard structural primary framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing. Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.

- 1. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
- 3. Frame Configuration: One-directional sloped.
- 4. Exterior Column Type: Uniform depth.
- 5. Rafter Type: Tapered.

C. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch.
 2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- D. Secondary Framing: Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet prepainted with coil coating, unless otherwise indicated, to comply with the following:
1. Purlins: C- or Z-shaped sections; fabricated from minimum 0.0598-inch-thick steel sheet, built-up steel plates, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.
 - a. Depth: As required to comply with system performance requirements.
 2. Girts: C- or Z-shaped sections; fabricated from minimum 0.0598-inch-thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees to flange and with minimum 2-1/2-inch-wide flanges.
 - a. Depth: As required to comply with system performance requirements.
 - b. Location: Inset
 3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from 0.0598-inch-thick steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for metal panels.
 4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch diameter, cold-formed structural tubing to stiffen primary frame flanges.
 5. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
 6. Base or Sill Angles: Minimum 3-by-2-by-0.0598-inch zinc-coated (galvanized) steel sheet.
 7. Purlin and Girt Clips: Minimum 0.0598-inch-thick, steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
 8. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from minimum 0.0598-inch-thick.
 9. Framing for Openings: Channel shapes; fabricated from minimum 0.0598-inch-thick, cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.
 10. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
- E. Bracing: Provide adjustable wind bracing as follows:
1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50; or ASTM A 529/A 529M, Grade 50; minimum 1/2-inch-diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
 2. Cable: ASTM A 475, 1/4-inch-diameter, extra-high-strength grade, Class B zinc-coated, 7-strand steel; with threaded end anchors.

3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
 4. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
 5. Fixed-Base Columns: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
 6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.
 7. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.
- F. Bolts: Provide plain finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated bolts for structural-framing components that are galvanized.
- G. Factory-Primed Finish: Apply specified primer immediately after cleaning and pretreating.
1. Prime primary, secondary, and end-wall structural-framing members to a minimum dry film thickness of 1 mil.
 - a. Prime secondary steel framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.
 2. Prime galvanized members with specified primer, after phosphoric acid pretreatment.

2.9 METAL ROOF PANELS

- A. Vertical-Rib, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
1. Material: Zinc-coated (galvanized) steel sheet, 0.0159 inch thick.
 - a. Exterior Finish: galvanized.
 2. Clips: Manufacturer's standard, floating type to accommodate thermal movement; fabricated from zinc-coated (galvanized) steel sheet.
 4. Joint Type: Mechanically seamed.

2.14 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels, unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
 2. Clips: Manufacturer's standard, formed from [steel sheet] [stainless-steel sheet], designed to withstand negative-load requirements.
 3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from [steel sheet] [stainless-steel sheet or nylon-coated aluminum sheet].
 4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- D. Flashing and Trim: Formed from minimum 0.0159-inch- (0.40-mm-) thick, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.
- E. Gutters: Formed from minimum 0.0159-inch-thick, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2438-mm-) long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
1. Gutter Supports: Fabricated from same material and finish as gutters; spaced 36 inches (900 mm) o.c.
- I. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.15 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following tests and inspections and to submit reports.
- B. Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special Inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.
1. Special inspections will not be required if fabrication is performed by a manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.
 - a. After fabrication, submit certificate of compliance with copy to authorities having jurisdiction certifying that Work was performed according to Contract requirements.
- C. Tests and Inspections:

1. Bolted Connections: Shop-bolted connections shall be [tested and] inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. Welded Connections: In addition to visual inspection, shop-welded connections shall be tested and inspected according to AWS D1.1.

PART 3 - EXECUTION

3.1 ERECTION

- A. Before erection proceeds, [engage land surveyor to] survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.
- C. Erect metal building system according to manufacturer's written erection instructions and erection drawings.
- D. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- E. Set structural framing accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- F. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- G. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure.
- H. Primary Framing and End Walls: Erect framing true to line, level, plumb, rigid, and secure. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven days after placement.

1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and snug-tightened or pretensioned joints.
- I. Secondary Framing: Erect framing true to line, level, plumb, rigid, and secure. Fasten secondary framing to primary framing using clips with field connections using non-high-strength bolts.
 1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
 2. Locate and space wall girts to suit openings such as doors and windows.
 3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- J. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
 1. Tighten rod and cable bracing to avoid sag.
 2. Locate interior end-bay bracing only where indicated.
- K. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- L. Erection Tolerances: Maintain erection tolerances of structural framing within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.2 METAL PANEL INSTALLATION, GENERAL

- A. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
 2. Install metal panels perpendicular to structural supports, unless otherwise indicated.
 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
 4. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 5. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- B. Lap-Seam Metal Panels: Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or metal panels. Install screws in predrilled holes. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.

3.3 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations.
- B. Field-Assembled, Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
- B. Roof Insulation: Comply with the following installation method:
 - 1. Over-Framing Installation: Lay 3" blanket insulation over and perpendicular to top flange of secondary framing members. Hold in place by metal roof panels fastened to secondary framing.
 - 2. Between-Purlin Installation: Extend insulation between purlins. Place vapor-retarder at bottom of purlin, overlapping adjoining facing of next insulation course maintaining continuity of retarder. Fill cavity completely. Hold in place with bands and crossbands below insulation.
 - 4. Retainer Strips: Install retainer strips at max. 4'-0" o.c., straight and taut, nesting with secondary framing to hold insulation in place.
- C. Blanket Wall Insulation: by others.

3.7 DOOR AND FRAME INSTALLATION

- A. Door & frame installation by others.

3.8 WINDOW INSTALLATION

- A. Window Installation by others.

3.9 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

3.10 FIELD QUALITY CONTROL

- A. **Special Inspector:** Owner will engage a qualified special inspector to perform tests and inspections and to submit reports.

3.11 CLEANING AND PROTECTION

- A. **Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.**
- B. **Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.**
- C. **Touchup Painting:** After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
 - 1. **Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or SSPC-SP 3, "Power Tool Cleaning."**
 - 2. **Apply a compatible primer of same type as shop primer used on adjacent surfaces.**

END OF SECTION 13125